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THE AMERICAN FARM ECONOMIC ASSOCIATION

Volume XXXIV

DECEMBER, 1952

Number 5

THE AMERICAN FARM ECONOMIC ASSOCIATION

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U. S. INTEREST IN WORLD LAND TENURE REFORMS

Chairman: Marshall Harris, Bureau of Agricultural Economics

THE UNITED STATES FARMER AND THE WORLD AROUND HIM

JOHN J. HAGGERTY, Director
Office of Foreign Agricultural Relations

AS THE Director of the Office of Foreign Agricultural Relations, I find myself daily concerned with the several ways in which the foreign situation affects the United States farmer, and the ways which United States' farmers can and do influence the direction and force of world events. I accepted a place on this program with what might have been considered unseemly alacrity because I believe that the subject of my remarks is of great importance to American agriculture and will become increasingly so in the coming years.

Briefly, as we in OFAR see the problems in our day-to-day work, there are three major areas in which the U. S. farmer is brought face to face with world problems and the great issues of the day. These are: *first*, as a producer of food, one of the major weapons against totalitarian aggression; *second*, in the area of international trade, without which neither our own economy nor those we have spent billions of dollars to re-establish can survive; and *finally*, in the area of technical assistance, including whatever is in our power to bring land tenure reform, in its broadest sense, to the less-favored farmers in other parts of the world.

I hope that when I have finished it will have been made clear that the United States' interest in world land tenure reform is a vital one. It is one in which the U. S. farmer has an uncommon interest because it is out of his own experiences and accomplishments that we must draw the wisdom and strength for the struggle over land tenure reform that lies ahead.

The Farmer As a Food Producer

The American farmer as a producer of food stands in the first order of battle against aggression. Those of you who are younger than I am may not remember the slogan of the first World War "Food Will Win the

War—Save It.” Some of you who are older than I may have had a hand in coining that slogan and almost certainly there are men in this room who helped to plan and carry out the food production and conservation programs of that era. There is hardly a man here, I suspect, who has not played some part in the farm production goals program during World War II and in the era of troubled peace which has succeeded it and in which we are still enmeshed. You know from personal participation the extent to which American agricultural production and the disposition of our crops are planned with an eye to the requirements of those other friendly countries whose destinies are irrevocably linked with ours, and ours with theirs. There isn’t time, nor for this audience should there be the necessity, to review the decisive contribution of U. S. agriculture to the reconstruction of the war-torn economies of Europe and Asia through UNRRA, the most gigantic relief and rehabilitation program in man’s history; or the Marshall Plan, wherein we undertook to bind up the national economic wounds of friend and foe alike and to turn their feet and their faces firmly in the direction of those democratic institutions without which there is no peace worthy of attainment. You all know the general measure of success which has been achieved and you know where and why we have failed.

I might, however, briefly mention that it was the timely extension of U. S. economic aid to Greece and Turkey which made it possible to check the spread of totalitarian aggression in that part of the world before it reached the key waterways of the Eastern Mediterranean. Again, it was U. S. economic aid, consisting primarily of one-half million tons of food and feedstuffs from American farms, which prevented the almost certain collapse of the Yugoslav government following the disastrous drought of 1950. Had that occurred, there was every likelihood that the forces of aggression would again have stood on the Adriatic, casting their evil shadow over Italy, Greece, and the Suez Canal, and flanking our positions in Austria and Germany. In the same year, 1951, three million tons of American wheat and grain sorghums¹ were made available to India in order to avert a famine which might have entailed the loss of this great free nation to the forces of aggression.

It is a very significant and fortunate circumstance, not only for America but for all of the free world, that in these times U. S. agriculture is not only able and equipped to meet these emergency foreign food requirements but that cooperation and understanding between the U. S. farmer and his government have been developed to a sufficiently high degree to permit such obligations to be undertaken and carried out. I shall not dwell on the amazing record of U. S. farm production in the face of re-

¹ 83.7 million bushels of wheat, 19.8 million bushels sorghums.

duced labor force, relatively constant area of land in crops, and increasing costs. I am sure most of you know these details far better than I, and the BAE people present here have undoubtedly been over this ground with you during the past three days. The point I wish to make is that U. S. food can stop and has stopped aggression in its tracks, not once but many times, in every major world region within recent years and it almost certainly will be called upon to do so again, some time, somewhere, as the need arises.

When a man or a nation is hungry to the point of desperation, there is a powerful appeal to the doctrine that security can be attained by surrendering liberty to an all-powerful, central regime. Personal or national liberty tends to become an empty slogan not worth defending in the face of hunger, misery, hopeless poverty and economic despair. American food produced on American farms can make the difference in strengthening the will of people to stand up against aggression, both within their own countries and from outside, and we may anticipate continuation of this role of the U. S. farmer as a producer of food, the chief weapon against aggression.

The Necessity of Foreign Markets

American agriculture is geared up to move a substantial portion of its total output into foreign markets. Under normal trade conditions, however, this movement cannot take place and does not take place unless our foreign customers have the dollars with which to buy. Most of us very clearly remember the economic depression into which this country had fallen in the early 30's when exports of farm crops fell off, thereby necessitating a cutback in agricultural production all along the line. Acreages planted to cotton, wheat, and our other major export commodities were greatly reduced under the original agricultural adjustment program in spite of the unsatisfied want for these commodities abroad. It is one of the most elementary tenets of economic science, however, that a want does not constitute demand without the ability to pay. So farmers in the United States were broke, their lands and homes hopelessly mortgaged, and foreclosure riots occurred right here in the heart of the Corn Belt. The economic depression of the 30's was not limited to the United States; it was worldwide in its scope. The products of farms and factories were backed up in the areas in which they were produced.

To what extent this was due to the fact that the doors of trade were, to a large extent, closed by protectionist measures both here and abroad would be rather difficult to establish. The Reciprocal Trade Agreements legislation first enacted in the United States in 1934 was hailed both at home and abroad as a promise that trade might be expanded by the re-

moval, on a reciprocal basis, of those impediments to trade created by governments for protectionist or other reasons.

Since World War II, and undoubtedly strongly influenced by the programs of economic aid which the U. S. government has extended to many of our traditional trading partners, we have succeeded in recapturing, and in many instances exceeding, our pre-war foreign markets for farm products. In the last year of record, 1951, we exported 34 per cent of our cotton, 23 per cent of our tobacco, 48 per cent of our wheat, 45 per cent of our dried whole milk, 28 per cent of our soybeans, and substantial quantities of other farm products including fresh and dried fruits. In 1951, total exports of farm products were five and one-half times by value and more than double by volume what they were in 1935-39.

Maintenance of these foreign markets is essential, not only to continued prosperity of American agriculture, but also to the maintenance of a high level of economic activity and full employment. We have learned in the past that the American economy as a whole cannot prosper if agriculture is in a depression.

The extent to which foreign sales of farm products depends upon reciprocal trade has been largely obscured in recent years by the war and by relief and rehabilitation programs. It should be obvious, however, that unless we are prepared to continue indefinitely to subsidize our exports—in effect, to give them away—we must give consideration to the opportunities for our trading partners to earn the dollars with which to buy our products. If we want to sell, we are going to have to buy.

Now that the economies of the European nations are again re-established at or above pre-war levels of activity, it is to be expected that programs of American economic aid will be tapered off. Sooner or later trade will have to find its way back into the traditional commercial channels, an event, I might say, generally desired by the countries of Europe. While our so-called "give away" programs have been gratefully received by these countries during the period when their economies were badly disrupted by war, they do not want to be perpetual mendicants depending upon the scraps from our table. They want to be able to stand on their own feet, to sell the products of their labor, and to buy their needs in the market place. They want to trade for the same reasons we do, and must, if our economies are to continue to expand. It is perfectly clear, therefore, that United States agriculture has a vital stake in expanding rather than shrinking world trade in farm products.

It is equally clear that U. S. agriculture must be constantly vigilant against the wave of protectionism which appears to be mounting all around us, both at home and abroad. American agriculture must come to see that our foreign customers will be able to buy our products only to the extent that they can get possession of the necessary dollars with which

to pay. These dollars must be earned, for the most part, by making sales in the United States market.

While the American farmer's interest in expanding trade might seem to be, from the foregoing, primarily a selfish one, there is a broader sense in which this selfish interest coincides with the aspirations of the free world. We have, and rightly so, poured billions of dollars into the rehabilitation and reconstruction of the economies of Europe and certain Asiatic countries under the Marshall Plan. Primary purpose of this program has been to strengthen the will of these peoples to resist the threat of totalitarianism both from within and from without. It has been a part of the broader effort to strengthen the forces of democracy in the free world. It should be plain, however, that this battle can still be lost unless we can hold out to these countries the necessary assurances of trade and intercourse which will guarantee the expansion of their economies on a sound commercial basis, thereby giving to them the final guarantee of the independence which they and we fought side by side to assure.

Technical Assistance and Land Reform

Finally, U. S. agriculture is called upon for *technical assistance*, to contribute scientific and practical knowledge and technology to the less developed nations of the world in order to help accelerate their rate of economic progress.

The whole concept of this program, known the world over as Point Four, after the fourth point of the President's inaugural address in 1949, is to help peoples to help themselves in the more rapid development of their natural resources and of their own skills and production practices. In many areas of the world, especially in the Orient, this program holds out for millions of people, for the first time, the assurance of the elementary right to live. The major emphasis is placed on increased productivity, especially of food, so that there will be enough to go around and no one need starve if he is willing and able to work. In these programs of agricultural technical assistance, the main lines of endeavor are in the three fields of research, resident education, and extension—a triumvirate long established in this country but virtually unknown in many parts of the world. Of these, extension, as we know it, is usually the missing link. Scientific or practical knowledge knows no nationality and no frontier but there must be channels and facilities for its dissemination. In the Point Four program, therefore, we are emphasizing the development of agricultural extension programs, in order to bring existing knowledge down to the individual farmer or peasant who works the land.

Some measure of the immensity of this task may be gained from the fact that in one country alone—India—our Point Four program and the Ford Foundation, working together, are financing an extension training

program and helping to establish 70 large extension projects which embrace 21,000 villages. It is only necessary to point out that India has 500,000 such villages for you to realize the enormity of the task to be done.

In the American technical assistance program, we now have 60 extension agents in India and contemplate a total of 100, within the limits of budget within which we have to work. The government of India, with its 26 constituent states or provinces, has now established central extension services at the federal and state levels patterned much after our own. Today, as I speak to you, the Commissioner of Extension for India and almost all of the 26 state directors are in this country on a fact-finding study tour of our extension methods and practices to see what values they can derive from our experience, for application to the problems of increasing farm production and improving rural living in their country. They know it is a long-time job. They are laying a firm foundation, but it will be years before they can hope to have an adequate corps of trained agents to reach an effective portion of their half million villages and 250 million rural people. Nevertheless, they are getting on with the job and so are the leaders of other free countries such as Pakistan, Iran, Indonesia, and many others. Some of these nations have gained their national independence only within the past few years and are facing problems no less agonizing than those which the founding fathers went through in this country more than 150 years ago.

Land Tenure Reforms

As Americans, we believe that ownership of the land by the man who works it carries the best assurance of political stability, orderly economic and cultural progress, and the march of humanity toward true democracy. We believe this, not only out of our own national experience but we know in our hearts that it is right. We know it from our observations in other lands where the land working peasantry have been ground under the heel of feudalism and slavery for a thousand years before the white man first set foot on the American continent, and we know it from the lands where those conditions still exist today. It is no more coincidence that these are the same lands and countries which today teeter on the brink; where our government and theirs are cooperating in programs of economic development and land tenure reform before it is too late.

The U. S. interest in world land tenure reform is inextricably tied up with the basic question of our national security. In the same way and for the same reasons that we recognize the need for economic progress in the less-developed areas of the world, we must also recognize the vital necessity of land tenure reform. For the fruits of his labor must be assured to the land-working peasant through equitable and acceptable systems of land tenure, broadly defined, so he may achieve the status and dignity

of a free man in a free world. If this is not done, all the economic and military aid we have poured out and can pour out to safeguard the free world against the insidious poison of totalitarianism will be as so much water down the drain. We could mount guns wheel to wheel across the belly of Europe, or of Asia, or of America, and they would not stop the infiltration of totalitarianism into the minds of men. We can conceivably double or treble the production of agriculture and of industry, we can pile wheat on top of corn on top of cabbages in abundance, to the point of world surplus and economic collapse, and it will be of no avail in the battle of our generation unless we give to the people who work the land a vital stake in democracy, something to live for, and, if need be, something to die for.

I do not mean to imply that the American institution of the family farm is a cure-all for the evils of the world. Perhaps there are areas where the deep-rooted tradition of the people and their culture incline them toward collectivism. The important thing is that they be permitted to exercise the right of self-determination, protected in that right not only by their governments but by their own vigilance and their own organized efforts in their own behalf. I believe it is in this latter field that U. S. agriculture has its greatest contribution to make, based on our experience of recent years.

During our life-time, the American farmer movement has come of age. It has reached a point of maturity wherein the 17 per cent of our population who work the land and feed the rest of us have organized in their own self-interest, and in the national interest, to assure that degree of well-being, economic incentives, and security of tenure on American farms which is essential to continued progress in productivity. The American farmer, like the American laboring man in industry, has erected around himself a fortress of practical militant democracy. The U. S. farmer has the numerous government programs which assure to him the research findings, the material facilities, and the economic inducements for all-out production. He also has his own farm organizations in the American Farm Bureau Federation, the National Grange, the Farmers Union, and the National Council of Farmer Cooperatives to maintain vigilance and defend his interests, if need be, in the halls of his government.

I do not believe it is in the power of the United States government to impose democracy or liberty on any people, including our own. But we can demonstrate to the world how the American democracy works in practice and in principle. While the practices may not everywhere apply, the principle of self-determination is universal. Until this principle is generally accepted throughout the world, the United States, as its chief advocate, would be foolhardy to relax its vigilance against those evil

powers who oppose it. And nowhere in the whole structure of human institutions is this principle of self-determination more loaded with good or with evil for the future of mankind than in the basic problem of land tenure reform.

It lies largely with American agriculture, therefore, to provide the spiritual and technical leadership for a sustained, world-wide farmer movement, to gain for the farmer the status and dignity of a free man in a free world; a proper share of the fruits of his labor; all of those things which go to make up better rural living and the promise of a better life for his children. In that sustained effort, American agriculture must expect to be called upon again and again to supply the food necessary to sustain the bodies and the spirits of those engaged in the battle, and we must keep open our doors to trade, in order that ground once gained shall not again be lost.

AGRICULTURAL PRICE POLICY

Chairman: F. W. Peck, Farm Foundation

WHAT SORT OF PRICE POLICY IS PRACTICAL IN THE U.S.A.?

FREDERICK V. WAUGH

Bureau of Agricultural Economics

PROFESSOR Jesness and I were asked to state what price policies we believe to be practical in the U.S.A.

Clearly, this assignment does not call for an idealistic treatment. It is right and proper for economists to have ideals. Plato's "Republic" and More's "Utopia" gave us a vision of the satisfactions men might obtain eventually, when and if human natures could be improved. From the same idealistic point of view, the economist may ask what sort of price policies would maximize welfare, insure the most efficient use of resources, or give us the highest possible level of living, if everyone would do as he should. He will distinguish two very different problems: the problem of equity, and the problem of using our resources in such a way as to maximize our total national real income. He may demonstrate that one way of maximizing national real income would be to set all prices equal to marginal costs. (Parenthetically, I would note that this is not the only way.) He may advocate that we put our trust in competition and free market prices, hoping that most of these prices will gravitate toward their marginal costs—also hoping that some way can be found to deal with equity without interfering with prices.

This sort of analysis suggests certain ideals toward which we probably should move. But I doubt if any economist would claim that these ideals would be reached simply by an abandonment of price policies by the U. S. government, by labor, and by business. I am quite sure that no economist would recommend a policy of non-interference with farm prices as long as labor unions have wage policies, and as long as businessmen have policies which hold prices above marginal costs—thus enabling them to cover overhead costs, and perhaps to make profits.

Farm economists are practical people. They give practical advice about feeding hogs, about marketing cotton, and about improving city markets for perishable foods. Congressmen and administrators have a right to expect us to bring forward practical proposals for economic policy. If Professor Jesness and I carry out our assignments, we will outline the kinds of policies and programs we would recommend to a Secretary of Agriculture, or to the chairman of a Congressional Committee on Agriculture. These proposals should meet three tests:

First, they should be workable from an administrative standpoint.

Second, they should be acceptable to the public. The United States is a democratic country. Programs must be authorized by Congressmen, who are elected by citizens. No program is practical unless there is a reasonable chance that it might be authorized by the Congress. Some of my professional brethren seem to prefer not to consider the public acceptability of a proposed policy. Some even seem to think there is something wrong with a program if the public votes for it. A well-known economist once told me that he opposed the former food stamp program because, as he said, "it was designed to get both the farm vote and the city vote." This has always seemed to me to be a very undemocratic point of view. In any case, it is obviously impractical. A program is not practical in the United States of America unless the people, or their representatives are willing to vote for it.

Third, practical price policies must give reasonably satisfactory results over a period of years, in order to continue to have the support of the people. Long-run acceptability is more important than immediate acceptability. Prohibition was politically acceptable for a time, but before many years the public became dissatisfied with it.

What Does the Public Want?

These are days of market surveys and public opinion polls. We know something about what the public wants. I believe that the public wants economic policies designed to accomplish three things:

First, it wants these policies to promote continuous, increasing prosperity. It wants a rising, and reasonably stable, level of national income. It wants to avoid business depressions and unemployment, or at least to moderate them.

Second, it wants equity; that is, a fair distribution of incomes and purchasing power.

Third, it wants to attain the first two aims with as little regulation, and as much room for private initiative, as possible. In fact, attainment of the first two aims should lead to the conservation and expansion of our liberties, not to their destruction.

Certainly the economist cannot object to these basic aims of the people. His job is to advise them as to what policies offer hope of approaching these objectives, and to warn them against policies likely to interfere with them. Professional economists can give helpful advice on methods, much as the professional entomologist can give helpful advice about killing Japanese beetles.

But the killing of Japanese beetles is a much simpler job than that of assuring economic prosperity and equity. There is room for honest differences in judgment, even among competent economists, as to which

measures are likely to be the most beneficial, or least harmful. These differences are usually exaggerated in professional meetings. Differences of opinion make horse races and debates, both of which are amusing to spectators. But the exaggeration of these differences neither helps our profession, nor enlightens the general public.

I shall try in this paper to outline in a broad way some of the policies which I think would be helpful. These will be my own personal views. They should not be taken as any indication of official views of the BAE, or the USDA, where I happen to work. Neither should they be taken as an argument against anyone else's views. Specifically, I am not debating the recent report of the Farm Foundation, nor Galbraith's book, nor Brandt's recent paper on farm policy, nor any other report, book nor paper. Nor am I discussing the platform of any political party.

Invisible Hand Not Enough

In my opinion, it would be unrealistic to advise the American public to put its trust in the "invisible hand," and to follow a policy of complete non-intervention in the year 1952.

The public may expect more from government intervention than it can get. But the public also knows that it wants some kinds and degrees of intervention. It knows that competition is neither pure nor perfect in modern society, and it suspects that it would be impractical to reorganize our society in such a way that competition would even approach the purity and perfection needed to assure the "most efficient use of resources," or to "maximize welfare." It knows that economic depressions are facts which cannot be disproved by Say's Law, nor by Bastiat's "Harmonies Économiques." And it knows that the invisible hand is no guarantee of equity—it is not designed to give people what they want, need, nor deserve.

Not even the indifference curves and mathematics of the welfare economist can convince the American public that all economic controls are bad, and therefore we should scrap all farm programs, disband the labor unions, and break up all large industrial concerns, in the hope of getting benefits from universal competition. The ordinary citizen with a grammar school education knows better than that, and so does the economist.

But neither can the economist ignore the workings of the invisible hand. It is not practical to ignore the laws of supply and demand. Within limits, however, it may be possible to use these laws to advantage. It may be possible to prevent a collapse in farm prices in situations such as existed in 1949. And it may be possible to build up reserve stocks which tend to damp inflationary pressures, such as those existing in the second half of 1950 and in early 1951.

It may be well to note here that many people talk as if the farm pro-

gram were always inflationary. There is real need for an objective study of this matter. It should include both price supports and price ceilings. And it should include production policies as well as price policies. I think such a study would show that government farm and food policies were inflationary in the 1930's, anti-inflationary during World War II, neutral from 1946 through 1948, anti-deflationary in 1949, and anti-inflationary from the middle of 1950 until the present time. In general, the timing has been good—perhaps partly by accident, but to some extent, at least, by design. It has tended to strengthen prices in periods of deflation and to restrain prices in periods of inflation. It has helped make the economy more stable. It has probably benefited non-farmers, as well as farmers.

Obviously, an impartial study would also show that some price-support measures have been ineffective and that others have had unfortunate results. No economist can justify some features of the potato-price-support program in its later stages. Of course, some interferences can be bad, and can soon lose the support of the public. And it is possible that farm price supports in general may sometime get so high and rigid that the whole program will be condemned. But it hasn't happened yet, and it need not happen.

The economist has a duty to warn the country of dangerous trends in methods and levels of price supports. He can help greatly by pointing out workable adjustments in levels and in methods. But I doubt if a single farm economist would seriously advocate complete reliance upon *laissez-faire* in the United States of America in the year 1952. Some economists may emphasize the goal of freedom and private initiative (which all agree is desirable), but surely we all know that the American people are not anarchists: they do not want an extreme form of individual liberty if it interferes too much with prosperity, stability, and equity. Rather, they want a system which rewards free enterprise, and at the same time reduces poverty, unemployment, and ignorance.

Price Policy and Equity

One of the main arguments for farm price-supports has been that farm incomes are too low and should be increased. This is an equity argument. Parity and equity mean about the same thing. Various farm economists have made a good theoretical case for programs aimed at raising farm incomes without significantly affecting market prices. The proposals of Froker, Norton, and Working are aimed at this. So are income payments to farmers. A much clearer equity case could be made for payments to low-income farmers, either to help them become efficient farmers, or to help them get productive jobs in industry.

A strong equity case can be made also for some form of food stamp pro-

gram, or food allotment program, to help low-income consumers, and to provide a good market for perishable foods. This case is especially compelling when food prices are being supported by the government.

What bearing has this upon the practicability of farm price supports?

First, the economist can bury his head in the sand, and refuse to look at problems of equity, either in agriculture or in the non-agricultural sectors of the economy. He can deal only with prices and with the use of resources. These problems are easier to analyze than are the problems of equity—but they are also less important.

Second, the economist has an important, and very difficult, job of educating the public as to the merits of dealing with equity problems in ways which do not disrupt prices too much.

Third, unless and until some other programs are authorized, the economist should not object to price measures. The economist may argue that farm incomes should be supported by some program which will not affect farm prices. But this is no argument against price supports unless and until the other methods are accepted, authorized, and in effect.

A Practical Program

The following policies might be practical in the U.S.A. in 1952:

1. *Research, education, and information* should be further expanded and strengthened. These programs have demonstrated their practical worth as means of increasing the real incomes both of farmers and non-farmers. But there is room for much more improvement, both in farm management and in marketing. It can be accomplished partly by research and education. As a part of this process, we need to extend and strengthen our statistical services, market news, and outlook work.

2. *Cooperative buying and selling* should be encouraged both as a means of increasing efficiency, and as a means of enabling farmers to compete with large processors and distributors on a more nearly equal basis of bargaining power.

This does not call for special favors or subsidies to farm cooperatives, nor for arbitrary discriminations against non-cooperative forms of business. The colleges and the U. S. Department of Agriculture have encouraged cooperatives largely by helping them with problems of education, service, and credit. This is a good program, and doubtless should continue.

Economists may well see dangers in the misuse of bargaining power by strong cooperatives. They remember the failure of many cooperatives who tried to exercise monopoly powers to maintain prices in the 1920's. The dangers of monopoly power are real. But also it is realistic to admit the existence of large tobacco companies, meat packers, milk distributors, and chain stores. In my opinion, it would be unrealistic to break up most of

these large and efficient corporations in order to give farmers equal bargaining power. Mass production and mass distribution have doubtless benefited farmers, as well as non-farmers. But it has left the individual farmer in a weak bargaining position. He must either strengthen his position by organizing cooperatives, or he must receive increasing protection from the government—and probably both.

3. *Marketing agreements and orders* should be greatly expanded in number, scope, and character. The present law authorizes marketing agreements and orders only for milk and for certain fruits and vegetables. It authorizes very limited kinds of programs—fixing prices of milk, and regulating shipments of fruits and vegetables, for example.

Marketing agreements are developed and operated largely by farmers, with the approval of the Secretary of Agriculture. If approved by a substantial majority of farmers, the agreements may be enforced by orders. But the government buys no surpluses, makes no crop loans, and pays no subsidies under these programs.

I suggest that the whole concept of marketing agreements and orders be expanded. We should authorize agreements and orders covering any farm product (1) if, after full hearings and study, a finding is made that it will promote the public interest in specific ways, such as eliminating known inefficiencies, improving the quality or healthfulness of food, or stabilizing supplies and prices; and (2) if it is approved by a substantial majority of the farmers directly concerned.

Some states have set up market authorities, authorized to develop and carry out programs for building and operating improved city market facilities. In principle, some of the programs carried out by state market authorities are similar to marketing agreements and orders. These programs must, in practice at least, be approved by a majority of the dealers in a city before they become effective. Usually they are designed to be self-supporting. Public funds are often needed to help finance new facilities, but the plan usually calls for repayment from fees collected for the use of the market. Market authorities commonly can enforce rules of trading which are approved by a majority of the trade, and which are found to be in the public interest.

But the larger markets for farm products are interstate in character. The business done in these markets affects farmers throughout the country. There might be merit in some sort of federal-state marketing agreement and order, or some sort of federal-state market authority, which could cooperate with the food trade in New York City or Chicago to improve physical facilities and to enforce suitable rules of trading.

International commodity agreements may be needed in the case of several farm products which we export or import. The aims should be to stabilize world supplies and prices, and to facilitate trade. In the long

run, we should doubtless move toward the ideal of freer international trade. But in the real world of 1952, we must deal with practical conditions of currency controls, managed imports and exports, and the continuing need for foreign aid. We do not have a simple choice between free international trade and managed trade: the practical immediate question is the kinds and degrees of management which we will accept.

4. *Price supports* have an important place in this program. The practical question, I think, is not whether farm prices should be supported—it is how and at what levels they should be supported.

Farm prices are notoriously unstable. Many economists have shown that this instability interferes with the efficient use of farm resources, especially when one takes account of the time leads and lags involved. More important, it often threatens the stability of the whole price structure, and of the economic system itself. Some form of forward pricing is essential, both from the standpoint of allocation of resources and from the standpoint of economic stability. We have had a form of forward pricing for some years now. Not all economists have been satisfied either with the levels of support or with the methods of support. But on the whole, the kind of forward pricing we have had has helped us to maintain a fairly stable level of farm production, as well as a steady flow of farm income.

There are some economists who think that the economy can be stabilized by monetary and fiscal policies alone. I would have more confidence in a program which included a variety of other measures—public works, unemployment benefits, and farm-price supports, to name a few. The price-support program need not always raise the prices of farm products. At times like the present, as in World War II, it would be a powerful inducement to full production. And the surpluses stored up in times of recession would also add to supplies in periods of inflation. A sound farm-price program can help stabilize the whole economy.

5. *The levels of price support* must be practical and realistic—that is, they must be attainable without severe and unpopular restrictions upon farmers, and they must be responsive to conditions of supply and demand.

Some economists have suggested rather complete flexibility in the level of price supports—usually proposing that the parity concept be abandoned, and that support levels be determined either entirely at the discretion of the Secretary of Agriculture, or by some unnamed, but presumably wise, group of “experts.” I doubt the practicability of these suggestions.

Of course, there is always the danger of political pressure to tinker with the parity formula and to raise the level of supports to a higher and higher percentage of parity. But the practical answer is not to abolish the parity formula. It is to improve the parity formula, and to work out a practical support program based upon it. I see no good economic reason for placing

all supports at the same percentage of parity. I do see practical reasons for a parity formula, and for some realistic adjustments in the level of supports in relation to parity. If the parity formula should ever be dropped, I would confidently predict that price supports would be based upon some pseudo-scientific figures purporting to represent the cost of production. And I would be greatly surprised if economists liked these figures even as well as parity.

The so-called "modernized" parity is potentially a real improvement. It should be made effective just as quickly as an orderly transition can be made. We should eliminate as soon as possible the present procedure of computing two parities, and using whichever is higher.

Parity formulas of one kind or another are coming into general use by labor and business. Wages are being tied to the Consumers' Price Index. Industrial prices are adjusted to changes in wages, raw materials prices, and other costs. Parities for labor, business, and agriculture are coming to be recognized in public policies and sanctioned by government agencies. This has its dangers. If each group manages to adjust its parity formula to its own advantage—choosing an unusually favorable base period, for example—the wage formula will represent more than labor's fair share, the industrial price formula will represent more than industry's fair share, and the farm parity will represent more than the farmer's fair share. Then if the government guarantees full parity to each group, it has guaranteed a permanent and disastrous inflation. The economist can help keep our parity formulas realistic and practical. He can present sound economic arguments for resisting political pressures to doctor the formulas to get special advantages for this group or that group. But the economist who is simply against parity, or who insists on criticizing the farm parity formula alone, has little to contribute.

We need more attention to parity income, as well as to parity prices. And we need to define the parities (or fair relationships) between the incomes of agriculture, labor, and business. John D. Black's, "Parity, parity, parity" is important not only to agricultural policy, but to economic policy in general.

But even with perfect formulas, it would not be practical to guarantee that all farmers, all industrial workers, and all businessmen get full parity all the time for all the commodities they produce.

6. *Methods of support* should include, as at present, crop loans and purchases; also, it would be desirable to authorize direct payments for some perishables.

For the present, at least, loans and purchases appear to be the most practical way of supporting storable crops. Marketing agreements and orders provide a degree of support to milk and to some fruits and vegetables. Probably the marketing agreement and order program should be

expanded. Until it is, some direct payments should be authorized.

In my personal opinion, the arguments about method have been greatly exaggerated in recent years. The key problem is the level of supports—not the method of support. If the supports on wheat, on honey, on grass seed are too high, they will encourage over-production, whether the support is by crop loan or by payments to the farmer.

7. *Food consumption programs* can play an important part in the farm program—especially in the case of perishables.

We should expand school lunches and institutional feeding.

More important, we should be ready to institute some form of food distribution program, when the need for it is more apparent than now. Doubtless, the public is not now ready to authorize such a program. There are now few, if any, food surpluses. And we are likely to forget that poverty still exists at a time like this when employment and wages are high. I doubt if it would be practical to try to institute a food allotment or food stamp program immediately.

It would be practical to develop now detailed plans for a program which could be organized and put into operation quickly when the need for it is more apparent. And perhaps it would be practical to begin to try out various proposals on a small scale in order to test the feasibility of new methods and techniques.

Theoretically, some form of stamp or allotment program should be a very efficient way of accomplishing two goals: strengthening the market for perishables, and improving the diets of low-income families. But several practical administrative features need to be worked out if it is to be fully efficient for either purpose. Is it feasible for the food trades to absorb part of the administrative load? How much should participating families pay? Should payments depend upon income, as in the allotment proposals? To what extent can and should the subsidy be concentrated upon particular foods which are in surplus? How can the use of stamps for the purchase of non-foods be minimized? These and many other questions need to be answered before we develop an effective, generally acceptable program to improve the diets of low-income families by the use of stamps, coupons, or tokens.

8. Finally, we need a program of *agricultural development*, aimed at the economic exploitation of our soil, water, and forests. Conservation alone is not the aim of economic life. To be prosperous, we must develop our resources not only on a sustained-yield basis, but on an increasing-yield basis. Conservation can help, insofar as it enables us to exploit our resources more fully over a period of time. We can probably continue to supply enough food for our growing population, to make further improvements in American diets, and to export fair amounts of farm products. But to do this, we will need to develop our farm resources. And

to do this, we must make sure that farm prices are reasonably attractive.

Reclamation should be a national program, including the South and the East, as well as the West. In addition to irrigation, drainage, and flood control, we will need measures to assist farmers to make economic adjustments through the enlargement of farms, and through modern machinery and other capital requirement.

The Nature of Compromise

Probably some economists will say that these proposals are full of compromises. And, of course, they will be correct. These proposals involve compromises on such basic issues as free market prices vs. high and rigid price supports, and compensatory payments vs. the support of market prices. Anyone who objects to compromises will certainly find fault with my proposals. I can only say in my own defense that any practical price policy in a democratic country must be built upon compromises. I would, therefore, like to make a few concluding remarks about the nature of compromise.

Professor Kendall recently remarked that if some prominent statistician should undertake to prove that the earth revolves from West to East, someone would soon present counter-evidence that the earth revolves from East to West. Next someone would say that there seems to be merit in both points of view, and would suggest that the earth may revolve from West to East part of the time, and from East to West part of the time. And, finally, someone would propose to take an average and would conclude that the earth does not revolve at all.

Professor Kendall's example illustrates the kind of case in which compromise is impossible. There are many other cases. You cannot compromise full 100-percent-of-parity supports all the time for all farm products: you either grant it or deny it. Nor can you compromise free market prices—you accept them or you don't. In my opinion, neither of these extreme positions is practical. High, rigid price supports are impractical because they won't work over a period of years. Completely free market prices throughout the economy are just as impractical, partly because there is not the remotest possibility that they will be accepted by American citizens, either now or for some decades to come.

We have been fairly successful in supporting, and in stabilizing, farm prices through crop loans, the purchase of surpluses, payments to farmers, diversion programs, and other means. There is always a danger that these measures may be used to push farm prices higher and higher until we are shipwrecked on the rocks of inflation. This calls for frequent, and realistic, adjustments in the program. It calls for coordination of farm policy with general economic policy. It calls for compromises. The

economist who helps work out practical adjustments in the program is performing an important public service.

Does this mean that the farm economist should forget ideals, and simply try to work out clever compromises which can be sold to farm organizations and to Congressmen? Not at all. Without ideals, economics would indeed be a dismal science. Our ideals call for a high, and rising level of living for all people—farmers and non-farmers. They call for private enterprise and for a large measure of free choice by producers and by consumers. Economic science can help us to reach these objectives. The economist can help in two ways. He can educate the general public. He can also help to work out practical compromises which are not only politically feasible, but which will help us move toward sound objectives.

WHAT SORT OF A FARM PRICE POLICY IS PRACTICAL IN THE U.S.A.?*

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THE ARCHITECT of this program will bear witness to the fact that this assignment was accepted with considerable reluctance. His diplomacy and tact, which as a southern gentleman he possesses in full measure, not only overcame this resistance but also in turn effectively resisted the plea for an interpretation of the word "practical" which looms so large in the title which he devised for this occasion. What meaning shall we give this term in order to achieve a meeting of minds essential to fruitful discussion?

What Is Practical?

The suggestion from the man in the street may be that "practical" is the opposite of "theoretical" and that, consequently, we must shun theory. While one of the dictionary definitions gives support to this idea, it obviously does not provide the answer. Can theory be good if it has no application or relation to practice? Can practice violate sound theory and still be good? Are these not associates rather than opposites?

Substituting "realistic" for "practical" does not release us from the dilemma. Shall our realism be one which faces facts as they are, favorable and unfavorable? Or shall it be the brand which recognizes only selected facts, comforting to the particular bias to be served? The former actually may find itself condemned as "impractical idealism" by some who do not like the results.

Farm price programs are developed today largely within the political arena. To the politician, acceptability to the voters looms large in deciding whether a given idea is "practical." The test becomes one of whether it will win or lose votes. So, acceptability may be used as the key. Here again there is lack of adequate or accurate measurement. Who is in a position to say with finality that one farm price program is more acceptable to the majority of Americans than all others? An opinion poll very likely would yield a surprisingly large proportion of "don't know" or "no opinion" responses. The politician may assure us that there is no need of waiting for the majority to make up its mind. His experience is that a small minority which knows, or thinks it knows, what it wants may carry the day. The economist is a rank amateur in this field. He may take his cue

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from the politician whose chances of staying in office often depend upon how well he interprets the attitudes of his constituents.

Parity and Price Supports

The considerable amount of lip service given to parity and price supports by senators and representatives, especially from farm states, seems to indicate that these meet this test of practicality. But other doubts remain to be resolved. The uninitiated who think that there can be only one "parity" apparently have not heard the politician campaigning for "higher parity" and are not aware of the jockeying which goes on in selecting base periods, weights, and the like. Shall we use the 1910-14 base, or shall it be some modernized version? If decibels are acceptable indicators, selection from a variety of formulas is in order so that various commodities may have the particular "parity" most favorable to them. (Perhaps this might be called "the most favorable parity principle.")

That this may do violence to the very idea of parity is beside the point, for we must be "practical." But there is a fly in the ointment because farmers are buyers as well as sellers. The dairyman may not obtain unalloyed pleasure from supports of grain prices which make him pay more for feed. However, his ruffled feelings may be soothed by providing him with higher supports for dairy products as compensation for the increased costs.

A "Practical" Price Program

Farm programs of the past two decades have provided special consideration for a few products which have been designated as "basic." In a long-run support program it is difficult to find any compelling reason why peanuts should be accorded special treatment merely because Congress in its wisdom christened this crop "basic." Will not a "practical" program have to provide general coverage for all agriculture in the longer run?

A "practical" farm support program, hence, shapes up into one designed to provide price support for all farm products at 90, or perhaps even 100, per cent of the most favorable parity.

Here then is an answer to the question posed by the assigned topic. The accepted etiquette for program proposers appears to be that of marshalling all of the points in its favor and belittling or ignoring all others. This may be good strategy for the office seeker. However, an economist who lives up to his responsibilities cannot escape that easily. He is under obligation to examine his brain child critically and objectively. The politician may follow the philosophy of "sufficient unto the day is the evil thereof" and regard it unwise to look far ahead.

This escape is not available to the economist. Who would want to go under the knife of a surgeon not foreseeing in advance possible compli-

cations? Who would care to travel in an airplane constructed only for perfect flying weather? It is a rather late hour to propose fire-proofing of a theater when the audience has discovered flames and is rushing in panic for the exits. Failure to exercise foresight in such matters would not be excused on the grounds that this was "practical" or "idealistic." The guilty would be charged with criminal negligence. May not this be true of the economist if he carries his endeavor of being practical to the point where his foresight and judgment are dimmed?

Some Consequences of Price Supports

Consequently, we need to contemplate some of the consequences of such a "practical" program of price supports. The object of such a program would be that of adding to the incomes of commercial farmers by transferring income to them from consumers, handlers, and taxpayers. However, a supported price would continue to influence production and consumption. Promise of a favorable price is an invitation to expand output unless prevented by effective controls of production and/or sale. If the higher price is transferred to the consumer it will tend to reduce or shift consumption. One result of this "practical" program will be surpluses. The "ever-normal granary" and defense stock piling may be used to justify some accumulation of storables for a time. School lunches, a food-stamp plan, or other distribution may relieve somewhat the pressure in case of some perishables. However, the experience of the 1930's with a program of more modest price supports indicate that these means have limits so that curbs on production, or actual destruction or wastage, will follow.

The present administration, while apparently favoring high price supports on some nonperishables, has shown reluctance in extending such supports to perishables. The unfortunate experiences with potatoes and dried eggs provided a lesson. What has not been learned is that the same lesson applies across the board, the variation being one of time.

Price props during the 1930's were well below the 90 per cent of parity level but, even so, stocks of corn, wheat, and cotton mounted in the face of efforts to "adjust" production by holding acres in check. World War II came to the rescue. Politicians and others who glibly take their stand for high supports without controls of production or sale may trust to luck that farm programs will be unfailingly blessed with serendipity so that fortuitous circumstances will arrive on the scene and bail them out before the breaking point is reached. This is doubtful realism.

Accumulations of storables may be viewed as buffers against uncertainties of weather and other factors and hence no cause for alarm. But there are decided limits. Estimates¹ suggest that 450 to 500 million bushels of

¹ Reserve Levels for Storable Farm Products, Senate Document 130, 82nd Congress, 2nd Session, 1952.

wheat, 900 to 1,000 million bushels of corn and 4.5 to 5 million bales of cotton would be adequate for all except the most extreme weather hazards. Even with some additions on the grounds of military security, the amounts could accumulate in a short period of time with high support and favorable seasons. Carry-overs of such size are not probable without government aid. However, if the government sets out to provide such stocks, it should be guided by supply considerations rather than by price objectives. An expansion in carry-overs at best would be merely a postponement of the time when production or marketing controls would be needed.

An assumption buttressed by experiences of the past is that supports at the level suggested will require controls. These will need to be more effective than any which have been tried up to now on an extensive scale. Those who claim to be "realistic" in advocating high supports need to be fully as realistic in advocating controls with sufficient teeth to hold production in check and with sufficient flexibility to permit effective use of resources. This is not simple. Farmers who may look with favor on 90 per cent support appear to be somewhat less than enthusiastic about having production decisions made for them. It is doubtful whether those in charge of marketing agencies who advocate such supports are particularly eager to have the government exercise controls over their management decisions.

Are Prices Made in Washington?

As a feature of being practical, it may behoove us to take a look at some of the arguments advanced for price supports as well as to examine some of the more important costs they entail. One contention which has attracted attention holds that "farm prices are made in Washington." If this is a true representation of the situation, a strong case for supports is made. However, is it acceptable as a generalization? To make it so, price supports would need to be effective generally for farm products. Direct price supports have not been provided for a wide range of products. During the decade when high supports have been in effect on some selected commodities, the market has been above support levels much of the time. In fact, the concern has been over ceilings rather than supports. Clearly, the market has not been reduced to the level of impotency which the above slogan implies. Were this ever to come to pass, no logical reason is seen for restricting this to farm products. Why not do it for all prices, including wage rates? If this were done, Mrs. Consumer might discover that instead of being satisfied with exercising her price vote at the store, she should do it at the ballot box or voting machine. To her, ceilings might appear much more attractive than supports. The outcome might dampen the enthusiasm in some quarters for Washington-made prices.

However, is there any real reason for believing that we have turned, or

are ready to turn, pricing generally over to the politicians? Shifting price-making from the market to the halls of Congress and offices of government bureaus would create other problems which cannot be reviewed here. Many voters in the past, no doubt, have been swayed by expected personal gains rather than by considerations of general welfare in deciding how to vote. As the government expands its sphere of responsibility, the opportunities for play of narrow self interest expand. The temptation on the part of both elected and appointed government personnel to cater to such interest may alter materially both the framework and functioning of government.

There may be saving grace in the possibility that some day there may be a general awakening to the fact that government has only one source of means—the people. There may be considerable complacency over programs which profess to take from the rich to distribute to the masses. However, as the field of activity expands, it becomes more and more a case of taking from the masses and returning it to them minus the cost of the operation. The more this is done with an eye to keeping an administration in office, the smaller the role of equity and justice is likely to be.

Price Supports and Monopoly

An argument for farm price supports which enjoys considerable popularity is that they are justified as an offset to monopolistic price fixing and output restriction by industry and labor. Some who use this argument charge those who do not share their view with living so far in the past that they are unaware of the facts of life. Is it unfair to ask those who proclaim that they alone are realistic to provide more specific documentation to support the alleged pervasiveness of monopoly in the nonagricultural sector of the economy? Everyone is aware of the high degree of concentration in some lines. It is quite another matter to argue that this applies to all lines. Anyone who does not accept such argument may be charged with being a believer in non-existent free competition. But does competition have to be atomistic or perfect in order to be an important force? We live in an economy in which neither competition nor monopoly is perfect.

The assertion that the farmer alone "has to accept prices offered while others fix theirs" may be persuasive political dogma but as evidence it is weakened by many exceptions and limitations. Among markets for farm products, fluid milk and tobacco are characterized by comparatively few buyers. In the case of many other farm products a considerable number and variety of outlets are available.

But even if the picture of general monopoly outside of agriculture were accepted as being factual, it does not automatically follow that the answer would be to equip agriculture with offsetting monopoly power

through some government program. To be effective, such monopoly power must limit supply. Price supports will require production and market controls to do the job. Such controls involve determining who are to have the right to produce and sell, and in what amounts. If the individual is to gain, the program must set up some barriers to entry into farming. Believers in the monopoly doctrine ought to develop their proposals to their ultimate end. Conceivably, such analysis might shake the faith of some in this approach.

Farmers' cooperatives are one way in which farmers may counteract to some degree the concentration among buyers of products and sellers of supplies without dependence on government. Marketing cooperatives necessarily are limited in their monopoly powers because they do not control production and non-members share in gains. However, purchasing cooperatives are less vulnerable on this score.

Unrealistic conclusions often are drawn from the fact that when depression strikes, agriculture maintains output and has to accept price cuts, while industry cuts output and is more successful in maintaining price. There is confusion over price and income. Price does not yield income except as it is applied to goods or services. Maintaining price is not synonymous with maintaining income if output has to be curtailed.

Is the answer to monopolistic restrictions that of generalizing them? Does compounding sin lead to salvation? Will agriculture as a whole gain from having government exercise monopoly power in its behalf? Will general welfare be served? How realistic are we in advocating such a program unless we can provide affirmative answers?

Disparity of Farm Income

But what about the contention that price supports are needed to overcome the alleged disparity between farm and nonfarm incomes? Satisfactory income comparisons are not easy. The popular method of using the average farm income appears plausible until it is remembered that a sizeable proportion of the farm population does not produce for market. The cash income from sales when allocated among those who actually produce for market presents a different picture. Particular question may be directed at a program which mostly benefits those farmers for whom the claim of disparity is in greatest doubt. The question which concerns us, however, is over the appropriateness of using price supports as the solvent for income disparity. If, as alleged, people do not earn as much in agriculture as in other lines, does the answer lie in draining the treasury for perpetual aids rather than in programs to bring about a better balance in resource use? Action based on an affirmative answer will perpetuate, not correct the situation.

Some Cost Considerations

A program of high price supports represents an endeavor to change the flow of the income stream to give farmers a larger share. Cost considerations clearly have a place in an appraisal of practicality. The easy assumption is that price supports take "from him who has for him who has not." To the extent they add to prices at the consumer level, there will be many who will take exception to this. Besides, the farmer has no monopoly on price consciousness. If price supports add to the cost of living they will represent a convenient basis for "escalating" wage rates, some of which, in turn, shows up as increased costs to farmers and, hence, become a factor in higher supports *ad infinitum*.

To the extent the program requires funds from the treasury, it becomes an added cost to taxpayers, including farmers. If covered by deficit financing the costs may be in terms of inflation. This does not seem to deter some political candidates from advocating both high price supports and lower taxes.

A serious cost of high price supports is the difficulties they set up in our international relations. This is made more serious by the fact that so many persons who think they are "practical" overlook this point entirely. A high price attracts products like sugar draws flies. When some of these products are imports, the instinctive reaction is to raise trade barriers. This is no mere theorizing because we already are doing it. Our pleas to other nations to open their gates to trade may expect to fall on deaf ears if our actions belie the sincerity of our words. Prices supported above market levels inevitably become nationalistic.

Besides, keeping prices at arbitrarily high levels adds to problems of selling abroad. A form of two-price system seems like a ready answer but doubts arise when the reactions of foreign competitors are noted. Americans object to having products dumped on our markets. We should not be surprised if other nations take the same view of our actions.

Results of some farm programs of the past two decades show that it is more than theoretical imagining that price supports and concomitant production quotas may be reflected in land prices. If such a capitalization process occurs, the gain goes to the holder while it takes place. The buyer who pays the higher price does not gain but acquires a vested interest in having the program continue.

If high price supports generally improve the net income position of farmers, it may tend to slow down city-ward migration and, thereby, interfere with adjustments in resource allocation. Controls over rights to produce, however, might have to be so strong that they would counteract this effect in part.

"Practicality" Reconsidered

Time is an important factor in self-ratings of personal practicality and realism. The claim to being "practical" in advocating price supports above market levels may seem to rest on a more secure base if concern centers on the immediate effects. The politician may find that current expediency pays dividends at the ballot box. An economist has more difficulty in being true to his responsibilities by living in this day-to-day manner. No doubt, many of those who voted for the Smoot-Hawley tariff in 1930 thought they were very practical. Some of them dismissed with scorn the ideas of economists who had the temerity to express doubt about the measure because they were "theoretical," and presumably beneath notice.

The question of what farm price program this nation should adopt is a matter of judgment. That being the case, there is room for a considerable difference of opinion. However, in view of the considerations indicated and others which could be brought into the picture, it is within the realm of probability that programs other than arbitrarily high price supports and their accompanying controls may be more practical and realistic in the end. Stop-loss price supports, to provide a reasonable floor under farm prices, may be very useful protection for the farmer if serious depression strikes. They will avoid a good many of the undesirable consequences of supports above the market. They will leave the function of arriving at price levels and relationships to the market most of the time. Income payments may do the job even better than stop-loss price supports. They will interfere less with the market. Any mention of payments in lieu of supports will raise the cry that this is the "Brannan Plan." We likely will be told in no uncertain terms that farmers "want to earn their returns as prices in the market place and not be dependent on a government hand-out." We also may expect to be told that anything related to the "Brannan Plan" signifies regimentation. This is peculiar language from proponents of high price supports for these, like Secretary Brannan's proposal, would call for strict curbs on output.

Those who shrink from income payments of any nature may do well to ponder over the points involved. For one thing, has anyone come up with a workable plan of high price supports on perishables? Is it realistic to believe that agriculture will be satisfied with a program only on storables? The distinction between prices supported by treasury funds and income payments from the treasury is imaginary rather than real. Farmers apparently do not have an incurable allergy against accepting and cashing government checks if one is to believe the evidence supplied by so-called conservation payments. Appropriations for payments for "agricultural conservation practices" are made without too much concern over whether

these payments are primarily additions to farmers' incomes or they actually yield commensurate returns to the public in terms of conservation.

Economists might as well reconcile themselves to having their ideas tempered and modified, and to a considerable extent ignored, in the political arena and in every-day activity. Their position in this regard is not entirely unique. Note, for instance, how generally the advice and suggestions of the medical profession regarding how to care for our health are ignored. Economic as well as medical nostrums will remain popular. Economic "medicine men" with their panaceas will continue to shout their wares.

The run-of-the-mill politician is a novice as an economist but often does not seem to know it. The average economist is fully as much at sea in the give and take of politics, but may not realize it. The agricultural economist needs to be fully aware of and acquainted with the world in which he lives, but at the same time he needs to preserve his professional independence and judgment. He may well keep in mind the counsel of the late Frank D. Graham of Princeton who once said in a discussion of international trade, "The economist, however hard he fights, may not be able to overcome economic evil, but he is surely beaten in advance if he panders to it."²

DISCUSSION

T. W. SCHULTZ
University of Chicago

Jesness and Waugh have been exposed. They have come down to earth. They have been practical men, and you have, I am sure, enjoyed it—a strong dash of economic philosophy, a pinch or two of economic analysis, and a lot of common sense, mixed for the taste of the 50's although the recipes date back to the 30's. The policy diet by Jesness may seem to have a little less variety than that by Waugh, but both are abundant as befits a rich country where agriculture is a relatively small part of the economy and where farmers are important politically.

Jesness's paper contains two big surprises: a bold endorsement of the Brannan Plan, followed by an implicit approval of buffer stocks of 450 to 500 million bushels of wheat, 900 to 1,000 million bushels of corn, and 4.5 to 5 million bales of cotton to offset the "uncertainties of weather and other factors." But I looked in vain for even a friendly nod on the possibilities of forward prices. Hope, of course, springs eternal.

Waugh's paper, also, favors us with two surprises. This paper opens by striking two strong clear chords—the problem of resource allocation for production and the problem of equity in the personal distribution of income. The second of these had a melodious sound, but I regret to say that as his composition unfolded it soon became a lost chord. There is also the invisible hand. After

² *American Economic Review*, Supplement, March 1943, p. 334.

a brief recitation of the accepted ritual on the limitations of the invisible hand, Waugh coyly reaches for it but does so in the dark and we cannot tell with how much warmth.

To our many colleagues from other countries attending these meetings let me suggest: Do not infer from what you may hear or read that there has developed a fundamental cleavage among agricultural economists about policy for U. S. agriculture. Take, for example, the two papers before us. Both endorse income payments during depressions or when prices fall far and suddenly; both see advantages in public storage and that it was fortunate we had a lot of wheat and corn on hand when hostilities flared in Korea; and both disapprove of the recent public waste of potatoes, the indiscriminate dumping of some farm products abroad, and the all too high CCC loan rates now set for wheat. Observe, also, that both neglect the same basic elements, namely, the uneven economic development of U. S. agriculture and what to do about this problem. They also neglect the all too unequal personal distribution of income within agriculture for there is not a word about the depressing lot of Negro farm families, Mexican nationals, and the many native white farming communities beset by poverty.

Nor should you conclude that the United States is rapidly approaching a crisis in its policies for agriculture. On the contrary, these policies never appeared more "successful" to those who specialize in practical politics, that is, to our would-be presidents and congressmen of every complexion. Not until the CCC acquires really very large stocks of wheat and cotton, and perhaps of corn, will there be a serious overhauling of existing price support legislation. Meanwhile, the major perishables may expect more, rather than less, price shelter.

Even so, ideas about economic policy are powerful and changes in these are a clue to the more distant future. In the United States, as elsewhere, we are painfully rediscovering that the supply of money affects the general level of prices and that we cannot afford to neglect monetary management. Some of our farm leaders have been in the vanguard in bringing monetary policy back into our national housekeeping. Nor is the United States as illiterate or as inconsistent about international economic relations as it may appear to those who have to adjust to our present policies affecting trade. Here, too, I believe we are likely to rediscover for ourselves the functions not only of trade but also of investments abroad on a large scale where Americans, both on public and private accounts, become responsible partners in many major development programs. Clearly, we are going to give even more attention to new and better production techniques both at home and abroad, and these go beyond technology narrowly defined for this approach will take account of farm management and even larger organizational efficiencies.

The ideas shaping monetary management, international investments, and the development of new and better production techniques are powerful and exceedingly important in taking our bearing for the years ahead.

There is, however, still another basic idea, referred to by Waugh as the "problem of equity," which agricultural economists, I regret to say, have not only failed to advance but about which they have often spread much confusion by misleading comparisons of income between farm and nonfarm people. But I hasten to add that neither Jesness nor Waugh made such a comparison in their respective papers. Where the problem of equity arises within agriculture, it is a strange behavioral fact that agricultural economists have avoided the issue

as if it were beyond the pale. The problem of equity is the chord that Waugh struck so clearly at the outset and then lost. But Waugh is at least aware of the problem, moreover, from other things that he has done, he is also concerned about it.

Since so much of what is said in evaluating price policy is based on income considerations, I must at least touch on the basis for my criticism. There are several underlying difficulties.

1. The social concept of equity for analyzing the personal distribution of income, including the opportunity to earn and the availability of public services, represents a fundamental set of values about which most agricultural economists feel uneasy and for which they are unprepared by training and experience. Moreover, at best it is hard to cope with this social objective and represent it in economic analysis.

2. It is necessary to distinguish between functional and personal distribution of income. Not to do so is an open invitation to confusion. Income for the services of factors acts as incentive in resource allocation and income acquired by individuals and families acts as purchasing power in consumption and in welfare. A loan rate of a dollar a pound on cotton would wreck the incentive function of price and income in using cotton resources; and yet there are those who approach the equity problem as if this were the way to alleviate the poverty of parts of the South. On the other hand, there are those who appear to believe that when each factor earns its equilibrium marginal rate, each individual and family will receive an income flow which meets all welfare requirements.

3. Data and studies of rewards to factors used in farming and how these rewards relate to comparable factors in other sectors of the economy, although basic in analyzing the economic efficiency of agriculture, are not at hand, and except for the work of two small groups is not on the research agenda.

4. Data and studies of the personal distribution of income within agriculture represent research that one avoids in the United States as would most economists from India avoid a study of the costs of catering to the welfare of cattle.

5. The easiest and most acceptable thing to do to those who vote appropriations for teaching and research (See Charles M. Hardin's study of the BAE under Fire) is to show that all farmers at all times fail to receive a fair share of the national income. In foul weather and fair, the favorite device is to compare the average per capita income of farm and nonfarm people. These comparisons, as already indicated, are very misleading and especially so in good times.

6. What happens to income within agriculture is our big blind spot. Let me merely mention some of the consequences of this particular blindness.

Take price supports which are under discussion. Have they altered the distribution of income within agriculture? It would be my guess that they are, in general, fairly regressive in their effects upon the personal distribution of income within U. S. agriculture.

Are most of the farm families who benefit most from existing farm programs poor by U. S. standards? The answer, I venture, is no.

Are the earnings of capital and of human effort devoted to farming in most of our major commercial areas on a par with earnings to comparable factors in nonfarm production activities in the U. S. economy? Here the answer, I suggest, is yes. This means, for example, that an Iowa (Dakota, California or New York) farmer who has, say, \$90,000 of his own assets committed in his farm,

earns about seven per cent on these assets and about \$3,000 for his work and another \$1,500 for his management—a total of \$10,800 of personal income. Is he poor? Obviously, no; are these particular rates of return approximately in line with existing economic conditions? It would be hard to prove the contrary.

Are there still many situations in agriculture where capital rationing is important and where the returns to the human agent are far below par? The Wilcox and Hendrix report suggests that upward of a million full time able-bodied farmers are caught in some such situation. Most of them are white; on the other hand, it probably is true that most Negro farm families operate under such adverse circumstances.

I am afraid you will infer from my remarks that the papers of Jesness and Waugh, despite, or is it because, of their wealth of common sense, are all too practical. If this is your inference, I shall not have been misunderstood.

DISCUSSION

O. C. STINE
Twentieth Century Fund

Papers presented at earlier sessions indicate that we have a farm price policy that is practical in the U.S.A. I refer to papers read in discussion of "Some Consequences of U. S. Agricultural Policies" by W. H. Nicholls of Vanderbilt University and H. M. Robertson of Brown and Williamson Tobacco Company. I was particularly interested in hearing Mr. Robertson discuss the price policies relating to tobacco from the standpoint of a practical business man. He considers the price policy relating to tobacco practical from the standpoint of the tobacco manufacturer as well as for the farmer. Another significant phase of our agricultural price policies was discussed by L. S. Thompson of Montana State College in a paper on "The Management of Reserve Stocks." From his paper I would conclude that we have developed a practical program for stabilizing prices and supplies of grains.

Dr. Waugh accepts, in general, the present agricultural price policy but would improve upon it. Dr. Jesness would retreat from it as far as possible. Dr. Waugh outlines a rather broad program indicating improvements with which I concur. Dr. Jesness devotes most of his paper to criticizing high level supports. He would accept stop-loss supports but would prefer income payments to any price supports. Dr. Waugh says the level is more important than the method. Thus, the most significant issue that emerges from these two papers is the level of price supports.

Both papers emphasize the fact that a practical program must be politically acceptable. A Michigan survey of the attitude of farmers in *This Journal* in August presented some very interesting information as to what kind of a program is acceptable to farmers. This survey indicates that farmers want supports, they want protection, but they do not want production control. They will accept direct payments but they complain about high costs of supports and government red tape. Since they do not want production controls they certainly would object to the use of such controls associated with direct payments.

I am told that interviewers reported that farmers as a rule do not understand parity and its relation to price supports. They consider parity a fair or just

price and do not understand why they should accept less than justice. Dr. Jesness denies that parity is a measure of equity, but we are likely to have it so used until someone presents a better measure of equity.

Dr. Waugh includes in his program a proposal to expand and strengthen research, education, and information programs. I suggest that in such an extension there should be a high degree of concentration on prices and parity. Farmers, administrators, and even some economists need a better understanding of the significance of prices in relation to consumption and production. Some economists would understand the farm problems more fully if they would turn from the study of Keynesian theories to more consideration of agricultural price relations. They need a better understanding of the differences among the several commodities in the responses of production and consumption to price changes. A better understanding among farmers and the public is essential in obtaining acceptance of long-run practical support programs.

High level supports seem to be practical in periods of inflation and full employment. Under these conditions many farmers are as reluctant to accept supports at less than parity as are laborers to accept wage reductions. In this respect, laborers and labor leaders are as economically sinful as farmers and farm leaders.

The test of a practical long-term farm price policy comes in dealing with periods of deflation and/or business depression. When the war ends it will be necessary for farm production and prices to adjust to a new set of conditions. Then we must face a choice between maintaining the high level supports with more extensive production controls and larger government expenditures, and adjusting to some lower level as more practical under these conditions.

The stop-loss supports proposed by Dr. Jesness might seem to be too low to be significant. Compromise between high and low support levels will be necessary. I believe that with better understanding of the problem on the part of farmers, a compromise program based upon the modernized parity, with supports adjusted in relation to supply and demand conditions to minimize controls and government losses, will be acceptable.

I wish to add a brief statement with reference to the proposal by Dr. Jesness that supplementary payments with prices left free to the market would be better than supports at any level. I do not think that this would prove to be practical across the board. I do not think that it is a practical proposition to apply to cotton and tobacco because of the relative inelasticity of those commodities. At the bottom of a depression, the consumption of these commodities can not be increased materially by lower prices. It is more economical to accumulate stocks from large crops, and in periods of depression, to be distributed in seasons of short crops or high level consumption. And the participation of the government in stabilizing both prices and distribution of these commodities has proved to be practical.

Potatoes present a good case for study and experimentation with supports for perishables. With supports we had too many potatoes and without supports they are scarce and prices are higher. The demand for potatoes is so inelastic that reducing prices has very little effect upon their consumption as food. A support level, corresponding to that in effect before supports were abandoned with only payments in support of returns to growers, could produce a supply that would reduce the prices paid in the local market in concentrated producing areas to zero. The consumers would pay the cost of transportation and handling

and the government would pay the entire returns to farmers. I do not think this would be acceptable to farmers or to the public.

Agricultural economists should analyze the problem of supporting potatoes and suggest a practical program both as to support level and method that would maintain a reasonably satisfactory supply of potatoes with stabilized returns to growers.

The method of supports, in any case, should be determined in view of supply and demand conditions and the probable results of the various methods available for support. Payments in lieu of loans and purchases should be authorized but used with discretion. I would agree that supports should be extended to perishables as well as to storable commodities. The most practical method in each case should be available and used.

SOME CONSEQUENCES OF U.S. AGRICULTURAL POLICIES

Chairman: O. V. Wells, Bureau of Agricultural Economics

OUR AGRICULTURAL POLICIES AND OUR ECONOMIC SYSTEM

DAVID MCCORD WRIGHT
University of Virginia

MY SUBJECT indicates that my job this morning is to judge agricultural policies from the larger framework of *general* policy—in other words the *general* welfare. I am afraid that much of what I will have to say will seem fairly obvious. But the longer I live the more I am impressed by the fact that it is not on esoteric points that people go wrong economically but on fundamentals. It is the “obvious” points which often seem the least appreciated, so it is with them that I propose to deal.

R. H. Tawney has pointed out that the practical thing to be done by a man in difficulty is *not* to advance as rapidly as possible in the wrong direction, but to sit down and figure out where he wants to go and how to get there. Therefore, I think we ought to begin with a general statement of social values—what sort of social system do we want, what do we believe in?

The social values most highly prized in this country, I suggest, have been growth, opportunity, creativity, raising living standards. And it is in their light that I propose to judge both our system and our agricultural policies. But these are not the only standards. There also are such standards as security, continuity, stability and so on. From the interplay, interaction, and contradiction of these values comes the confusion of modern American thought.

What are the basic economic consequences of economic growth? The problem can be summed up very quickly: growth comes through change and causes change. A simple rise in Gross National Product in and of itself, and leaving aside all new inventions, must change both the things people want and the way those things are made. The man who lived in one small house will not just live in two small houses, the man who drinks a bottle of beer a day will not just drink a barrel a day. On the production side, also, a change in the size of a plant makes necessary a re-designing of that plant; a change in a size of a farm makes necessary a reorganization of machinery and methods. Thus a 10 per cent increase, say, in Gross National Product cannot be a matter of just increasing the output of everything by 10 per cent. No indeed, output must be *re-designed*. New

industries, new products, new methods must emerge and old industries, old methods, and old products decline. And here is the fundamental point: *Unless a nation is willing to permit these continuing readjustments that nation cannot hope for continued growth.* This happens to be one of the few facts in economics which is absolutely beyond contradiction. But what are some of the consequences?

The most obvious consequence, and the one which the modern American seems most to resent is that some insecurity is a necessary and unavoidable accompaniment of rising living standards. Notice I only say *some* insecurity. We can do a lot to cushion the impact, it is true, and I will talk about that in a minute. But the one thing we cannot do is to guarantee unchanged prosperity and unchanged routine to all work groups. Here of course is the great rub.

Increasingly in American life each pressure group is trying to dig itself in and protect its little racket against the effects of change. Business attempted a general cartelization which brought forth the Sherman Act. Labor is increasingly turning toward seniority, feather bedding, and make work schemes, and this has produced the Taft-Hartley Act. The farmers are relatively late comers to the board. How should they act?

The great temptation is to join in the scramble for restrictive privilege and try to out-do the other fellow. As Senator "Pitchfork Ben" Tillman of South Carolina put it "every time a Yankee steals a shoat let's try to steal a hog." I am closely linked with the rural South myself and I have a great deal of sympathy and understanding for that attitude. Nevertheless, I think it is a short sighted and a disastrous one. For, if all great pressure groups follow it, the wealth, the freedom, and the opportunities of the American people will quite soon disappear.

The essence of the farm problems, it seems to me, following my friend Bill Nicholls here, is that there are too many farmers relative to the demand—yet restrictive groups, elsewhere in the economy, are holding back the transfers needed to give a fair and honorable opportunity to the surplus farm population. Now the farmers can react in one of two ways. They can try to fortify themselves against change and become yet another big and powerful cancer on the American body politic, or they can make a constructive response. And, while seeking that degree of mitigation and help which is possible within the competitive framework, put their main emphasis on lobbying for a policy designed to cut down on *all* restrictive groups and to reopen the avenues of opportunity, adaptation, and growth for the American people generally. Many cynical, predatory, and reactionary though avowedly "liberal" groups seem to me to be trying to seduce the farmers into the first policy. I should hope they would follow the second.

Limitations to Expanding Opportunity

What are the main forces today preventing adequate expansion—an adequate growth of opportunity. Notice I say *adequate* growth. Of course there has been some growth and we have been hearing a lot about it. But this growth such as it is, has been achieved only through inflation and even so it by no means serves to absorb in industry all who would care to participate.

Our generation is overwhelmingly demand minded. This is a natural reaction to the over-emphasis on supply of the previous generation. But isn't it time for a balance? Today we know that supply doesn't always create its own demand. But we are in some danger of forgetting that demand doesn't always create its own supply. I suggest that what we need is more venture capital, more equity financing, and that our highly equalitarian tax policies are rapidly destroying the incentives for risk-taking and industrial pioneering. The effects upon small growing business are particularly bad. For the income tax falls with disproportionate weight upon the new firm seeking to expand with internal funds.

But even more important to the general problem is the growing public acceptance of every sort of restrictive action by special groups to protect their privileges. Any sort of predatory behavior seems to be now acceptable if only it can be said to lead either to more *security* or to more *equality*. The repercussions on opportunity and growth are left altogether to one side.

Well, what can we do about it? First of all, we must deal with the real evils which have produced this state of mind. Every great revolutionary movement can be split into two parts: one, Utopian aspirations; two, attempts to remedy real evils. If we are not willing to deal constructively with the practical evils, we are bound to lose out.

Now obviously the great evil from which we are still suffering is the memory of and fear of another Great Depression. No program for dealing with pressure groups, therefore, can hope to succeed if it does not come to grips with the problem of *general* deflation. For it is the mistaken but attractive promise of all restrictive schemes that they will offer their members security from general deflation. In this connection I must confess myself still a residual Keynesian. It seems to me we ought to be willing, if it becomes necessary, to unbalance the budget and inject more purchasing power rather than experience a violent deflation. I should again stress, however, that purchasing power is only half the problem and that raising the "propensity to consume" will not accomplish much if accompanied by measures unduly burdening the "inducement to invest."

But merely avoiding general deflation is not enough. We can do a bit more. Those major productive groups which are peculiarly vulnerable to sudden shocks from changes in demand—including the farmers—seem to

me to deserve some protection. The answer seems to lie in the general principle of flexible price supports. We cannot support price and output indefinitely without enormous expense and the risk of stopping the whole growth of the economy. But we can give an adequate cushion and adequate time for adjustment.

Finally, in the realm of opportunity there is a great deal more yet to be done in the area of direct social services—health and education for example. The obligation of public authority to provide an adequate chance for the under-privileged seems inescapable. But what good does it do to give a man an education for a career and then deny him the opportunity of having one? For example, what good does it do to make a man a scientist if security-minded pressure groups cut off the practical use of his discoveries? All our policies—prevention of deflation, cushioning against sudden shocks, welfare services—should not and need not involve the terrific security mindedness and jealousy of incentive which is now in danger of wrecking our country. The punitive taxation of the very wealthy yields only a tiny return in revenue. As I put it in one of my books there isn't enough champagne money to give an adequate milk fund. It is *beer* money that needs to be taxed.

Economic Opportunity and the Brannan Plan

It is time now for me, in Sir Thomas Browne's words "to difference myself nearer" and come more specifically to alternative agricultural policies. It is in this problem of opportunity that I find my main grounds for dissent from what I understand to be the main principle of at least one form of the Brannan Plan. The Brannan Plan undertakes the direct planning of agricultural production by agreed quotas designed to maintain prices. Leaving aside the whole question of probably "monopolistic" use of the quota machinery to exploit other groups, it seems to me that it has yet a more important weakness. If the plan is to work, it must, I suggest, lead to the substantial freezing of most individual farmers at the level of wealth it pleased God to give them at the time the plan went in.

You can't fix the over-all quota without fixing individual quotas. The young farmer who wants to do a better job and to expand is debarred from doing so. If his acreage is limited but he increases his yield, won't that tend to upset the quota? If he cannot either increase acreage or yield, how can he improve himself? You say he can buy another farm and use its quota. But where could he get the money? Of course if he already has the money that would be one thing, but then we wouldn't be bothering about him in that case anyhow. The basic idea of a man's being a better farmer, and by a combination of saving and efficiency improving his lot, seems to me hopelessly incompatible with the rigid quota system. If it is adopted, the farmer will merely follow labor and many business units

into that general program of log-rolled stagnation which now threatens our economic system.

Conclusion

I realize that what I have had to say has been obvious and that some of it may seem naive. But I believe that American people are sick of trickery and evasion. I hope that there is today a growing demand not only for personal honesty but also for intellectual honesty. And what can the other road give *but* stagnation? As Washington put it "Let us raise a standard to which the wise and honest can repair. The event is in the hand of God."

DISCUSSION

WILLIAM H. NICHOLLS
Vanderbilt University

I was particularly pleased to note Professor Wright's emphasis upon the *dynamic* aspects of our economy—economic growth, resource readjustments to changing consumer needs, and the development of public policies which facilitate rather than impede such readjustments. As economists, we have unduly restricted our usefulness by our essentially static approach to the economic problems of agriculture and the rest of the economy. As a result, our understanding of both the cyclical and secular aspects of economic change is clearly inadequate.

To be sure, we have made considerable progress in understanding the nature of general cyclical fluctuations in employment, income, and demand. In fact, like Professor Wright, most of us are by now "residual Keynesians" in that we agree on both the necessity and the general means of preventing general *deflation*. Unfortunately, we cannot yet make the same claim for the economics of *inflation*. Here, we still disagree as to wise objectives—e.g., stability of employment at a high level (in a world of powerful trade unions) vs. relative stability upward as well as downward) of the general price level. We also disagree as to means—e.g., on direct vs. indirect controls and the relative efficacy of monetary and fiscal policies. Hence, we have fallen far short of our responsibilities for helping American agriculture and the general public to understand and make wise political choices among conflicting anti-inflation policies.

On secular problems of economic growth, however, our shortcomings are even greater. Despite the recent burgeoning of interest in the economic development of backward countries, the professional literature is largely nebulous and platitudinous. I believe that American agricultural economists have a rare opportunity to correct this situation. Right here at home, we have many largely rural areas which are economically underdeveloped. This problem is partly regional in scope, the South being the most obvious example. But it is most strikingly posed *within a region* by wide differences in economic development even among contiguous counties, some of which have experienced a significant influx of non-agricultural capital (usually associated with industrial-urban development) while their neighboring counties have not. In such a situation, analyses and comparisons of adjustments in land use, resource combinations,

scale of farm firm, human migration, and the nature and effectiveness of the local factor and product markets would be exceptionally fruitful in understanding the nature and effects of economic development, with particular reference to agriculture.¹

More generally, during the past decade of prosperity, most of American agriculture has made important readjustments helpful in solving its resource and income problems. Here again is an important opportunity to study the nature of economic change—particularly the relations between agriculture and the rest of the economy—and the resource readjustments which general prosperity has made possible. Such research would help us to understand much more adequately the basic structure of the American agricultural economy and the types of public policies which will facilitate desirable changes in the local, regional, and national economic environments.

Professor Wright has posed nicely the perennial conflict between economic security and economic progress. I would only add that this conflict involves regions as well as national producer interests. Thus, while capital and labor readjustments *among regions* are essential to our further economic growth, differences in sectional interests and the natural resistance to changes in business location, occupation, and residence offer important barriers. Furthermore, the South and other underdeveloped regions stand to lose most from present federal tax policies which Professor Wright finds so destructive of risk-taking and the growth of small business. On the other hand, his justifiable support of expanded public aid for education, health, and other direct social services would obviously benefit the South disproportionately.

Yet—while Professor Wright and I agree in our criticisms of existing policies and the nature of better alternatives—I believe that, with continued general prosperity, the importance of present restrictive special-interest programs will be minimized. Thus, while we share a common critical view of individual farm quotas, I find considerable hope in the resource readjustments actually under way within American agriculture. For example, in the industrially-advancing counties of East Tennessee—an important Burley tobacco area—many farmers feel that they can no longer afford to produce their legal quotas of tobacco as an alternative to dairying and beef cattle. Higher labor costs, improved local markets, and more adequate farm capital—all consequences of local industrial-urban development—have brought the beginnings of sound agriculture reorganization locally *despite* the highly restrictive federal tobacco program. Here, written in miniature, is the key to a real and lasting solution of many of the problems of American agriculture.

In closing, I should like to express my view that most land-grant colleges are falling woefully short in training agricultural economists capable of research in these fundamental interrelationships between agriculture and the rest of the economy. The typical undergraduate curriculum—and frequently, the graduate curriculum as well—is shockingly narrow. It is dominated by unnecessarily specialized courses both in the major field and in technical agriculture. As a result, it is very difficult for most graduate students of agricultural economics to achieve a minimum competence in economic theory, monetary theory, economic history, mathematics and statistics, and the related

¹ Cf. William H. Nicholls' article "A Research Project on Southern Economic Development, with Particular Reference to Agriculture," in *Economic Development and Cultural Change*, University of Chicago Press, October, 1952, pp. 190-195.

social sciences—not to mention the ability to use their own language skilfully and well.

Hence, I would urge department heads to re-examine and reorganize their curricula critically, with an eye to broadening the educational experience and perspective of their majors. The parallel of the better departments combining economics and business administration is suggestive. Why shouldn't there be a separate, much more general curriculum for those majors interested in the broader aspects of the agricultural economy rather than in farm business administration? Only then will we have an adequate supply of research workers in the economics of agriculture who are properly prepared for tackling many of the most significant problems at hand. And, perhaps more important, only then will such students be given a real opportunity to be on the way to becoming educated men.

IMPACT OF GOVERNMENT PROGRAMS ON AGRICULTURAL INDUSTRIES

R. WELBORN
Swift and Company

OUR assignment at this time is to discuss the subject, "Impact of Government Programs on Agricultural Industries." The President of this Association, in passing this assignment to us, supplemented it with a one-sentence qualification. "Of course," said Dr. Aull, "this topic might be rather broadly interpreted but we would like for you to confine your thinking *mainly* to agricultural control programs." We assume that he used the word "industry" in a restricted sense, to apply to that portion of agriculture beyond the farm.

We made no further effort to identify the limits of the subject as envisioned by Dr. Aull. We preferred to be free to discuss without inhibition any segment of the economic or political situation that might conceivably fall under the subject stated. We assumed at first that Dr. Aull was concerned primarily with agricultural *production* control programs. We later convinced ourselves that he might be equally interested in agricultural *price* control, either supports or ceilings. That latter interpretation was most comforting—it gave us room to concern ourselves with current issues.

Problems in Discussing Aggregate Impacts

Let me say at the outset that I find it difficult to think of the term "agricultural industry" or, in the restricted sense, "agricultural processing industry," as though it were a meaningful concept from the point of view of economic analysis. About the only homogeneous characteristic within that category is the reliance upon farming for basic raw materials. Otherwise, what is there in common between a cotton gin, a cheese plant, a cigarette manufacturer, a grain elevator, a fruit packing shed, a locker plant, and a packinghouse? How can one logically suppose that any generalization about the consequences of government control programs would be valid in any degree or to any appreciable extent for the economic aggregate that is called "agricultural industry"? Would it not be more meaningful to speak of the sugar industry, the grain industry, the livestock and meat industry?

And regardless of aggregate consequences, how can we logically expect that impacts would affect all segments of any industry to the same extent or even in the same direction? The function of the entrepreneur always is to adjust resources to the rules and circumstances of the moment with

the hope of earning an income in excess of cost. Capable entrepreneurs do not disappear just because the government formulates new rules. And to the extent that resource costs can be adjusted to the impact of particular changes in rules, profit opportunities arise which can be utilized by entrepreneurs who have sufficient flexibility to take advantage of the situation. We should therefore expect that in any such situation, profits would be reaped by some, losses by others. For that reason, it becomes somewhat pointless to discuss aggregate impacts on industry earnings as though they were meaningful.

Impact of Control Measures on Earnings

Still we should examine the aggregates to the extent that evidence is available on the point:

(a) In terms of profits, normally considered the all important criterion of industry welfare in a free enterprise economy, and particularly in terms of profits before taxes (which reflect profit opportunities), there is little evidence to suggest that controls have adversely affected the food industry. Profits (before taxes) of manufacturers of food and related products, when taken as a per cent of the value contributed to the national income by that segment of the economy, suggests that the early days of the New Deal were golden relative to the previous four years, and were exceeded only by the halcyon days of the OPA. And I have no doubt that sooner or later some ardent crusader for the virtues of a "managed" economy will dig up those statistics and use them as proof that business is really better off under controls than under free markets. It is easy to ignore the question of costs of such programs; and the old saw which states that "the Devil quotes the Scriptures to his own purposes," also is applicable to statisticians and statistics.

Let me say here with respect to the livestock slaughtering and processing industry, that such evidence as I have seen does not correspond closely with the total food industry statistics. I would judge that price control programs in the livestock slaughtering industry adversely affected profits in the aggregate for those who complied with regulations and who were in business prior to the development of the control programs. Certainly there is considerable evidence to suggest that there was a marked shift in volume from federally inspected to non-federally inspected operators, and away from the Midwest. Also, there is convincing evidence of widespread black market activity which was not participated in by the great majority of established processors. This certainly reduced profit opportunities for those operators who complied with regulations, and yielded extraordinary profits to willful violators who, by and large, emerged unscathed.

The adverse impact of such programs on livestock slaughterers arose from the widespread non-compliance with regulations, and from the fact

that the regulations could not be made flexible enough to accommodate the industry's constantly changing conditions.

There are some goals impossible of accomplishment, and the devising of workable price control programs for the livestock slaughtering industry is, in my judgment, one of them.

(b) There is no such easily obtainable measure of the impact of controls on the earnings of non-food agricultural industries. Let me simply state that the statistics of business failures do not reveal any startling increase in failures with the imposition of controls, and that the general measures of industry earnings *before taxes* do not suggest any wholesale suffering coincident with the imposition of control programs.

(c) Let it be made perfectly clear at this point that I am talking about the impact of *control measures* on earnings; I am *not* talking about the tax measures that came concurrently and did substantially and adversely affect the disposable income of most corporate businesses.

Reasons for Industry Opposition

If aggregate earnings before tax were not adversely affected, what is it that accounts for the widespread industry opposition to such programs?

First of all, it should be clear that industry (agricultural or otherwise) is not uniformly or unanimously opposed to such programs in general, and unanimous industry opposition to any particular program would be difficult to locate. The issues at stake are not describable in terms of conflict of interests between producers and industry. The conflict is not over relative rewards to farmers. Industry opposition to such programs (apart from opposition arising from particular adverse effects on profits) arises from the increases in costs, the inefficiencies, the shifts in competitive advantage, the red tape, and the severe limitation of entrepreneurial freedom that is part and parcel of all such programs. To elaborate:

(a) Almost any conceivable program disrupts, to some degree, normal trade practices for some firms. The very concept of a program implies the alteration of someone's behavior to a substantial degree. Such alteration almost inescapably creates a reshuffling of competitive advantages. And even though no one may be hurt in any absolute sense, some profit; and because they profit, they increase their resources and hence provide tougher competition.

(b) Some economic functions normally performed by some segments of the trade are in fact "nationalized" by almost any program. A price support program results in some agency of the government taking over and ultimately disposing of a considerable volume of product that the trade otherwise would have handled and ultimately disposed of—perhaps at lower prices, perhaps not. A price ceiling program, when effective, wipes out the allocation function as it is normally performed through sales or

ganizations. (Incidentally what price control does in expanding legal, statistical, and accounting costs; in increasing procurement costs and in creating uncertainties in production schedules, is a subject for a whole paper in itself.) All this is accomplished to the advantage of some and to the detriment of others.

(c) Almost always in connection with such programs, there are rewards which accrue to those who can successfully evade the intent of the program. That is particularly true of materials allocation and price control programs, but is also true of those who can manage to inject a little ex-quota tobacco, or peanuts, or wheat, or corn, or cotton into the flow of price-supported commodities. In terms of fundamental ethics, it is hard to convince a business man that any harm is done when terms of trade are arrived at that are satisfactory to both buyer and seller even though regulations specify other terms. It is characteristic in such circumstances that those who abide (either by choice or necessity) with program regulations find themselves forced to compete with those who trade on terms not permitted by the regulation. The longer the condition persists, the greater the disadvantage to the complier, for his resources become depleted and his ability to compete progressively diminishes.

It is an extremely irritating circumstance. And it becomes still more irritating to have the regulatory body knowingly close their eyes to such circumstances (often they can do nothing else) or worse still, subsequently sanctify the non-complier's action by revision of regulation or by a new interpretation. That sort of thing creates a good many reactionary imperialists who yearn for the dear, dead past.

(d) Many conscientious business men sometimes fail to perceive the innate wisdom and the public benefit to be derived from some program operations. It becomes a little difficult, for example, to ferret out the public blessings to be derived from imposing a ceiling on soybean meal, but at the same time permitting the manufacturer of it to sell the product at a price substantially over the meal ceiling providing he first mixes it with two to five per cent of some foreign matter such as mineral, corn, or mill feeds—an arrangement basically unsatisfactory to both buyer and seller. (This situation has persisted under price regulation for about 7 months, and is now apparently being corrected.)

(e) There is a certain lack of speed in obtaining decisions from regulatory bodies, particularly those centered in Washington, which creates extreme frustration. Time is of the essence in the preservation of values in many business transactions. Day after day, circumstances arise that do not clearly fit the program regulations. The circumstances call for immediate decision. So your business man wires Washington. Then he telephones Washington. Then he gets on the plane and flies to Washington. And

products pile up and men are idle, waiting for the official ruling. And days or weeks or months later, he is informed that the matter has been given careful consideration and that for various and sundry more or less obscure reasons, he can't do what seemed to him to be the most obvious solution to the situation.

(f) There is a clear awareness among business men of the ultimate costs of such programs and their impact on income *after taxes*.

(g) And back of it all there exists in the minds of many business men the low suspicion that control programs are at times operated for purposes other than those prescribed in the enabling legislation. The operation of blue stamp plans in urban areas, modification of price regulations at critical points in the storage season, maintenance of price supports on certain obscure and highly localized commodities, extension of business contracts to certain firms or types of business organizations, may not always be solely for the purpose of effectuating the stated program objectives. For while we, in this land, to an increasing degree, circumscribe the area of competitive freedom in the economic market, we continue to be quite competitive in the field of politics, and the ethics of political competition are not exactly clothed in garments of white.

Evaluation of Fact verses Theory Impossible

I am a little at a loss to know here whether we are exploring a problem or debating an issue. I can see no problem which can be partially or completely solved by a discussion of the impacts of controls on agricultural industry. I therefore assume that we are debating an issue. And I can only assume further that the issue we are debating is whether the programs that have been operated in recent decades were wise under the circumstances and contributed in the main to an improvement in public welfare—and hence are appropriate tools of social action to be continued in the future under similar circumstances.

Let me, therefore, speak directly to that point.

In my judgment, evaluating in any objective terms the impact of such programs is a problem which cannot be solved. I know no way of determining what would have happened if some different course had been pursued in agricultural policy.

I know of no way to add together impacts on the welfare of particular groups so as to emerge with a conclusion that in the balance what was done was good or bad.

I know of no way to evaluate what we have done and are now doing excepting from the point of view of logical consistency with some basic social philosophy. But since there is a critical difference among us as to basic social philosophy, even that alternative is not open to us. I can only

suggest that what we are doing be examined in the light of historical parallels—the eventual consequences of similar programs and policies in other ages and in other lands.

We are dealing here with a phenomenon that is infinitely broader than the science of economics and transcends by far the question of particular benefits to agriculture or to any segment of agriculture. Of concern here is only one minor manifestation of the whole broad problem of who shall exercise power within our society and the degree to which those who exercise power can be held accountable for the consequences. Let me suggest that economic analysis casts pitifully little light on that problem other than to describe the nature of the change in economic costs of one alternative relative to another.

From this viewpoint, let us look for a moment at what we are doing by the use of agricultural control programs. If you believe, as some naive observers of the economic processes do believe, that agricultural prices are "controlled," "managed," "fixed," or "manipulated" by power concentration in the economic institutions that have been permitted to develop in this country, then the programs simply transfer power from those economic institutions to political institutions of greater, more absolute power. Then the problem becomes one of assessing the economic costs of the transfer and the relative degree of accountability for consequences that prevails in politics versus the economic market. Those who look at the process from the vantage point of historical perspective can find little to reassure them, for there is little evidence in history to suggest that political institutions are any more "just," or "equitable," or "efficient," or act any more in the public interest than do the economic institutions that have been supplanted. Mr. Hitler and Mr. Mussolini provide the ultimate examples on that score in recent decades. Certainly the exercise of power by political institutions is less subject to check and counter-check than is the economic institution that was displaced, for the power of government is on the side of the political institution, and the economic criterion of solvency does not apply.

If, however, competition is a reasonably adequate force in the determination of agricultural prices, and in particular, if it is recognized that the economic market is not and can not effectively be made an institution for the achievement of "social justice," then the agricultural programs have simply created concentration of power to no purpose and in forms that can be held least accountable for the misuse of power.

In terms of the problem of power allocation, free enterprise economics, in theory, has two significant and commendable characteristics:

- (a) it enables competition to act as a major check against either uncontrollable power concentrations or the misuse of power at any point; and
- (b) it permanently separates political and economic power, placing

upon the political system the functions of an effective check against the misuse of economic power wherever economic competition fails to effectively control it.

It is true, of course, that political theory also suggests the existence of effective checks and balances against abuse of power, but not against the concentration of it in the hands of government. I submit to you that as political institutions amass power, they become less and less susceptible to effective check either against further concentration or against abuse.

In our judgment the great criticism to be leveled at agricultural programs (apart from the naivete with which they are conceived and the cynicism with which they are executed) is not that they contradict any basic economic principle or that they are wasteful or inefficient (which they have been). It is simply that they contribute in a major degree to the trend towards centralization of power that has long been in progress. And furthermore, they centralize that power in a political mechanism (as distinct from an economic mechanism) against which, beyond a certain critical point, there is no effective countervailing force, no effective check to prevent abuse of power. "The voice of the people may be the voice of God," but in a society where power becomes highly concentrated in the political machinery it not infrequently requires wars and revolutions to make that voice heard. To those who are skeptical on that point, I strongly urge a careful study of numerous relatively contemporary case histories in political evolution.

Some Suggested Fields of Inquiry

Those concerned with concepts of social justice will insist that anyone who disagrees with the propriety and fitness of what has been done should suggest a more acceptable policy. Without pretending to any authority in that field, I want to suggest to economists some fields of inquiry, the development of which may contribute to an improvement in policy formulation through time.

1. We need to know more of the circumstances and conditions which give rise to concentration of economic power in the private economy. It is fairly clear that size and power are not necessarily synonymous. It seems clear that variations in methods of internal management, character of the product handled, complexity of the processing technique, location of raw material supply relative to consumption, and various other factors have their impact on the ability of a firm to influence price behavior. But the whole complex of conditions needs to be set forth in a more generalized theoretical framework.

2. We need a little closer (and perhaps a little more objective) study of the nature and extent of economic competition in agricultural industry. It

makes no sense that the present wide diversity of opinion and the resort to name-calling should persist in these discussions. Those who would make such inquiry should look beyond the simple statistics of price. Price is only one element in an extremely complex set of tools used by competitors in the market place. I would also suggest that you not start out with a pre-conceived notion of what you will find. Not infrequently researchers find what they are looking for.

3. We need, and need badly, to develop an understanding of the relationship between economics and politics. All too frequently we bestow economic functions upon political institutions, not because we have examined the fitness of such institutions to perform the function thrust upon them, but because we become aware of the imperfections in the private economy. You do not, for example, necessarily improve the economic welfare of American agriculture by entrusting income distribution to the political mechanism where farmers are sharply in the minority and urban consumers are a constantly increasing majority.

4. We need to examine the myth that is now commonly subscribed to that political institutions are, by their very nature, operated in the public interest and that privately managed economic institutions are, by their nature, exploitative of the public. The free price system has come to be in some way morally suspect and controls are considered to be in some way ethically superior and pay greater regard to social values. I submit to you that those businesses most likely to succeed are those most keenly attuned to serving the public interest.

5. Someone with the gift of eloquence needs to restate what has often been stated in economic literature, that the market operates without concern for equity and justice, that one of its unique values is the impersonal and inexorable manner with which it divests the economic body of its non-productive, inefficient members.

The process operates without the wisdom born of hindsight and without the advantage of clairvoyance. It is heartless, utterly devoid of compassion. This is not to say that human beings should be equally devoid of compassion: only that institutions other than the market must be used to take care of problems of justice, equity, and mercy. One does not dig a ditch with a scoop shovel, nor scoop wheat with a spade. Similarly, one does not dispense charity, bestow mercy, or administer justice through control of markets, nor direct the allocation of resources and the production and distribution of goods through courts of equity or institutions of charity.

6. We need a better and more objective exposition of the behavior of agricultural prices relative to non-agricultural prices, and the nature and extent of economic adjustments that flow out of that behavior. I want to suggest that it is not accidental, nor is it necessarily a result of oligopolistic

competition, that in an expanding and increasingly industrial economy, incomes at the extractive level must be low relative to incomes in other segments of the economy. How else can human resources be induced to shift into the further processing of raw materials which is a necessary part of higher living standards?

7. We need to frequently remind ourselves, in the words of the recent permanent Chairman of the Democratic Convention, that "Action for action's sake alone is the last refuge of the mentally bankrupt." If that be true (and the gentleman from Texas should know), my impression is that there must have been a tremendous amount of mental bankruptcy in this nation in recent years.

Finally, I want to suggest that some problems are not easily solved, indeed many have no solution. And the reluctance of the business community to accept the solutions proposed by others is not necessarily because they differ greatly with the objectives to be attained. Rather, it is because they have learned through hard experience that (and I quote) "Words are not deeds, and there are no cheap and painless solutions" to many of our problems. Even the most carefully formulated programs seldom work as perfectly as the planners visualize, and thoughtful, practical men become exceedingly reluctant to trade an established system with known and endurable imperfections for an untried venture with unknown, but no less certain, imperfections that may be less endurable. An understanding of that point of view, and the degree of validity of it, might well result in sounder, though less dramatic, public policy formulation.

DISCUSSION

H. M. ROBERTSON

Brown and Williamson Tobacco Co.

This statement concerns itself with the rather narrow point of view of the consequences or effects of U. S. agricultural policies on one comparatively small tobacco manufacturer since the Agricultural Adjustment Act went into effect in 1933. Most of this company's purchases are directly from the farmer. Its purchases represent six to ten per cent of the flue-cured and burley tobaccos sold for domestic consumption, and these in turn are manufactured into various products and sold in the United States.

As you probably know, 70 to 80 per cent of U. S. tobacco products—cigarettes, smoking and chewing tobacco—are manufactured by the three largest companies. Three smaller companies, each manufacture less than one-half of the amount of such products manufactured by the smallest of the "Big Three." These three smaller companies carry on from 15 to 25 per cent of the tobacco manufacturing business. The balance of such tobacco manufacturing particularly in cigarettes, is done by three or four other still smaller companies. My company is one of the companies in the second class.

Tobacco manufacturers, having been involved in two important Federal anti-trust proceedings over a period of 30 years, have kept about as far apart from each other as any industrial organizations that I know of—so I speak strictly and solely for my own company, Brown and Williamson Tobacco Corporation.

Tobacco manufacturers enjoy four important advantages under the present policies being enforced by the U. S. Department of Agriculture:

First. In general, they have created fair and equitable economic conditions for the tobacco growers, our suppliers. This is vastly important to processors or manufacturers who are generally direct customers of the farmers. From a practical point of view, it was largely farmers' discontent that brought about two anti-trust suits by the U. S. government and these have been, to say the least, a matter of great concern to the tobacco manufacturing industry. Tobacco manufacturers must, whether they like it or not, be concerned with the tobacco growers' welfare.

In showing the effect on the economic conditions of the farmer, I shall deal with the facts relating to flue-cured type of tobacco as typical or truly representative of types of leaf tobacco generally. Flue-cured tobacco is grown in the Eastern Seaboard States from Florida to Virginia and constitutes about 62 per cent of all tobacco grown in the U. S. Air-cured or burley tobacco, produced principally in Kentucky and Tennessee, constitutes about 28 per cent of all the tobacco grown. The conditions in burley are practically the same as in flue-cured tobacco—flue-cured and burley thus constituting 90 per cent of the tobacco grown—making these two types of tobacco the principal raw material for the large U. S. cigarette business.

In the period 1919-1932 inclusive, the average price of flue-cured tobacco varied from 44 cents a pound in 1919 to 8.4 cents a pound in 1931. Total production fluctuated from 358 million pounds in 1921 to 865 million pounds in 1930. The gross farm value of this product varied from 211 million dollars in 1919 to 43 million dollars in 1932, with frequent fluctuations of 30 per cent to 50 per cent or more within two years during this period.

The farmer's lot was truly one of feast and famine. His unorganized position placed him where when he had a low price—with taxes, mortgage interest, and other farm expenses to pay—he knew no way out except to grow more tobacco and thus increasing the supply which might pull his price down still lower. Although the manufacturers did not admit it and fought strongly against the agricultural Adjustment Acts until very recently, I submit that this situation was not only highly unsatisfactory to the growers but due to the nature of it, should have been and was unsatisfactory to tobacco buyers,

Since 1935 when the Agricultural Adjustment Administration programs became fully effective, there has been orderly production of flue-cured tobacco to meet the demand, and prices, in general, have been about equal to the parity price. Average production during the 1930s was about 750 million pounds, fluctuating not more than 15 per cent between years (except 1939). Average production in the 1940s was about 1200 million pounds, fluctuating between years about the same as in the previous decade (except for 1948—caused by the British purchases being greatly restricted in 1947). There was a threefold increased consumption of cigarettes in 1950 over 1930—hence the increased production in the supply of leaf. Exceptions were 1939 and 1940, when the growers voted out the controls. In 1939 the production was 1,171 million pounds, up from 786 million pounds in 1938. The average price dropped from 22 cents in 1938 to 15 cents in 1939.

My company believes that the Government programs have resulted in prosperity and satisfaction to the growers, and fairly equitable distribution of wealth for those in each stage of operations from the planting of the seed to the manufacture of the final tobacco product.

Second. Under the stabilization programs with the support price to farmers, the government has acquired and maintained substantial stocks of tobacco which are available to manufacturers on fairly reasonable terms. I understand that the tobacco support programs have actually shown a small profit for the government. Having this supply available is an obvious advantage to manufacturers who can find stable prices even during emergencies caused by crop failure, fluctuation in any manufacturer's requirements, or other disturbances like sudden increase of demand from foreign countries. From the manufacturer's narrow point of view, this may be the most immediate, practical advantage of the program.

Third. The price of the manufacturer's raw material having been stabilized, there is much less operational risk involved than existed when there were uncontrolled markets with wide price fluctuations. At harvest time, tobacco manufacturers actually usually store approximately the amount of leaf tobacco which they estimate will be needed in their operations. This is generally a duration of from 30 to 36 months. There is not now, and never has been, any way whereby manufacturers of tobacco could hedge by market transactions so that they could suffer badly from wide fluctuations and risk. This risk has largely disappeared under the present policies of the government through the Department of Agriculture.

Further, if it be true, as I believe to be the case today—and which clearly was not the case 25 years ago—that the price of cigarettes has a closer and even direct relationship to the price of leaf tobacco, then the stabilization of leaf tobacco prices could have another important advantage to cigarette manufacturers. It makes available to them, with comparatively small risk, the LIFO method of accounting which could perhaps not have been used before due to the wide price fluctuations and the dangers from a tax point of view.

Fourth. The government grading of tobacco—there are some 100 grades or more in the case of flue-cured—has produced more orderly markets. Too, it has tended not only to prevent dissatisfaction of the growers, who often thought they were unfairly treated, but in effect has helped the buyers to purchase their tobacco in competition in a more orderly manner and indeed to help their grading. As this point is so controversial—indeed it may be solely my personal opinion—I will speak no more on it.

In the case of tobacco, particularly flue-cured tobacco, the success of the agricultural control programs may be attributed to certain factors that relate to the growing of this crop and not present in other important farm crops.

In the first place, and perhaps the most important, is the fact that the demand for this type of tobacco is comparatively inelastic.

In the second place, you have the homogeneity of all growers. They are all more or less the same kind of fellow.

In the third place, the growing of this tobacco is concentrated more or less in one section of the country, that is, the states of Virginia, North Carolina, South Carolina, Georgia, and Florida.

Again, the buyers of this tobacco are comparatively few—not much more than 10 buyers (excluding stabilization purchases) usually purchase about 90 per cent of the crop.

There is one great disadvantage to the manufacturers which some buyers

claim has come about through the present U. S. tobacco policy. In my opinion, this serious condition cannot be ascribed to the U. S. agricultural policies. Rather, it is the result of the farmers getting a fair and proper part of the wealth created by the industry as a whole. This complaint of the manufacturers is as follows:

In general and as a very rough approximation, the manufacturers of tobacco are today getting less returns on both their capital and sales than ever in the history of the industry. Primarily from the necessity of carrying vastly larger inventories, their capital requirements have largely been financed through debt. The inventories of the largest companies today are more than four times what they were 20 years ago. Their sales are more than four times what they were, yet their profits after taxes are substantially in line with what they were 20 years ago. Maybe they were making too much profit then—certainly they are making too little profit now. This, however, in my opinion, cannot be attributed to the U. S. agricultural policies but to other factors. The more important of these factors are:

1. The anti-trust suits have made the manufacturers timid on prices
2. Price controls have existed for a large part of the last 10 years
3. There are perhaps certain competitive conditions in the industry that did not exist prior to the anti-trust action in 1941
4. Inflation

Anyway, it is possible that the present profit position of the tobacco companies may become a matter of concern to growers as well as the owners of tobacco manufacturing companies. Prices of common stocks on the exchanges—the value of the equity dollar of the tobacco manufacturing companies—today are about as low as they have been at any time within the last 40 years and this notwithstanding that today sees us in a period of the greatest prosperity with stocks of all other corporations soaring.

There are of course in the manufacturing industry those who see in the tobacco control program regimentation, creeping socialism, and the other ideological concepts contrary to the free enterprise system. To direct the grower in the acreage he can plant, how he markets his crop, etc., are obviously contrary to the principle of absolute liberty and freedom on his part. However, the practical advantages to the grower and the manufacturer have resulted in a fading away of these objections.

This month, the flue-cured farmers—about 260,000 of them—voted 98.5 per cent in favor of controls. With farmers voting 95 per cent or more in favor of the control programs in cases of the principal types of tobacco crops and with the experience of the 1939 crop, it is difficult to see how at any time in the foreseeable future the tobacco industry will be without some controls along the lines of those which some people think have been so eminently successful in the present U. S. agricultural policies.

INTERNATIONAL TRADE IN AGRICULTURAL PRODUCTS

Chairman: H. C. M. Case, University of Illinois

PUBLIC PRICE POLICIES AND TRENDS IN INTERNATIONAL TRADE

MORDECAI EZEKIEL

Food and Agriculture Organization of the United Nations

THIS paper presents only an hypothesis to explain a number of post-war phenomena in world agriculture. A wide variety of research projects on prices and price policies are under way by FAO and various member nations, covering many countries and many commodities. Their results may gradually throw more light on the validity of this hypothesis.

General Trends in International Trade

International trade in food and feedstuffs since World War II has been characterized by a greatly increased dependence upon food exports from North America; a downward trend in exports from other traditional exporting regions, notably Argentina and Australia; and a shift of the Far East from a net exporting to a net importing basis.

Immediately after the war, these changes were explained as being due to war devastation and deterioration. Now, seven years later, they seem more like continuing features of the post-war world.¹

Many factors have contributed to this situation, including:

- (1) The widely different effects of the war on the economies of the Old and New Worlds,
- (2) U.S. policies of international assistance, from UNRRA through the Marshall Plan, and M.S.A.,
- (3) The continuing shift to more independent status of previous imperial dependencies,
- (4) The movement toward greater equality of income and consumption in many developed and under-developed countries,
- (5) The more marked upward trends in population since the war in both groups of countries,
- (6) The East-West political division of the world, with its effects on interregional trade,

¹ FAO, *State of Food and Agriculture and Review and Outlook*, 1951, p. 6, and FAO, "Some Aspects of Trends in World Trade," C.C.P. document 52/6, Rome, 1952, 22 pp.

(7) Continuing civil unrest, bandit or guerilla action, or even open war in many regions, and

(8) Imbalances in international payments and dollar shortages.

Part of the explanation for the trends in food production and trade, however, may lie in price policies for agriculture and in their impact on production and consumption. That is the issue which will be explored here.

Dual Functions of Prices

In almost all countries, various public measures are in effect to control or influence the prices or income received by farmers, at least for major products. To some extent, these policies have reflected balance of payment difficulties and other financial pressures. In establishing these measures, however, governments in many cases also have been preoccupied with one aspect of prices—prices as a means of distributing income and buying power. In many countries—as in the United States, Canada, the United Kingdom, Sweden, and many other European countries; and Australia and New Zealand—the effort has been partly to assure farmers of higher or more stable incomes. In some less-developed countries, the aim has been to obtain income for governmental use, either for current expenditure or to finance economic and agricultural development. In others, one objective has been to obtain sufficient food supplies for cities or to reduce food prices to consumers. In many cases, the control measures seem to have overlooked the fact that prices have a dual economic function—not only to distribute income, but also to regulate and harmonize production and consumption. In other cases, the regulating force of prices has been in part replaced by rationing of consumption, and by more or less direct planning or direction of production.

How far have the changes in the world agricultural production and trade been a result of these price policies and associated measures? Two obvious aspects must be considered—the effects of prices (1) upon production and (2) upon consumption.

Prices (or incomes) received by producers affect both the amount and composition of production. Prices paid by consumers affect consumption both in domestic markets and in export markets. In studying such price effects, other measures such as rationing or administrative direction of production must, of course, also be considered.

Kinds of Price Measures

National price measures may be grouped into several broad classes.² First are those aimed at increasing the prices and incomes of producers

² References to source materials on price policies are given at the end of this article.

compared to those which would otherwise exist. Not only the U. S., but many food importing countries have measures with this objective.

In the United States, the farm payment, production control, and price support measures of the New Deal period were widened, during and since World War II, by advance price guarantees and supports aimed definitely at encouraging and increasing production. Arrangements for exporting key products at competitive international prices or other agreed prices (as under the International Wheat Agreement) supplied export markets at prices often below domestic levels. These measures have been strikingly successful in raising and stabilizing the net incomes of farmers and in stimulating continuing increases in production. The average *real* net income per person engaged in agriculture has increased both absolutely and relatively, advancing 169 per cent in amount from the per capita average for 1926-1930 to the average for 1947-1950, and from 44 per cent of the average income per industrial worker in the earlier period to 56 per cent in the latter. The aggregate volume of agricultural output, which had increased only 21 per cent from 1913 to 1930, increased 49 per cent from 1930 to 1950, or at twice the earlier annual rate.

This massive increase in U.S. output during the past two decades, far more rapid than the increase in population, helped provide the food to save many regions from under-nourishment or starvation during and after the war. Since the war, however, per capita production in the U.S. has trended downward. Effects of the United States agricultural price, loan, storage, and export operations upon the regional, commodity, and trade aspects of the domestic and international economy is a matter calling for intensive study and analysis. Beyond its contribution to world food supplies, I would also note here the unfavorable effects of the reduction in U.S. cotton acreage in 1950 upon world cotton supplies. This intensified the post-Korean "boom and bust" in world raw material markets and soft goods industries.

In Europe, new measures have been superimposed on old policies. The general policy of high protective tariffs on farm products, first developed during the late '20's³ has been generally continued despite occasional concessions as a result of reciprocal trade agreements or GATT negotiations. Tariff restrictions have become in part meaningless as more direct restrictions on imports have been imposed through elaborate currency controls and import quotas. The development of the European Payments Union has produced some relaxation of currency controls on European imports, especially from the sterling area. In Europe, as in the

³ *World Trade Barriers in Relation to American Agriculture*, Senate Document No. 70, 73rd Congress, 1st Session, 1933, 54 pp. See also Mordecai Ezekiel and L. H. Bean, *Economic Bases for the Agricultural Adjustment Act*, U.S. Dept. of Agriculture, December, 1933, pp. 13-20.

United States recently with cheese, the policy of protection to politically important farm interests against potential foreign competition has produced many actions contrary to nationally declared policy. These "old fashioned" influences on farm prices through trade barriers have been supplemented in Western Europe as in the U.S.A., by a variety of direct public interventions.

Sweden, Norway, Switzerland, the United Kingdom, and the Netherlands have comprehensive price programs designed to provide adequate global income to farmers; while Belgium, Denmark, Italy, and Western Germany use price measures only piece-meal under pressure of special conditions, leaving as much freedom as possible. In France, the present objective is to avoid shifts in production from essentials to non-essentials.

In the United Kingdom, prices to domestic producers have mostly been maintained well above international prices, while imports were purchased as cheaply as possible through long-term contracts.⁴ Negotiated prices, subsidies per unit of product or per acre, subsidies on fertilizers, and subsidies to hold down prices of food to consumers, have all been used. In Switzerland, import quotas are manipulated to limit imports to levels which will produce prices satisfactory to farmers, as judged from farm account records. In some farm product exporting countries, such as Denmark and Holland, prices to domestic consumers and farmers are now below export price levels. The highly protective policies of some European countries, such as Switzerland, Sweden, Belgium, and France (where prices received by farmers—except for export products—are isolated from world prices, and usually much above them), are explained as necessary to maintain their traditional peasant agriculture.

Farm price interventions have been supplemented since the war by a rapid advance in European industrial production, buying power, and demand for food; by the general post-war shortage of food; and by the introduction of new agricultural technologies, especially in the handling of grasslands, which have increased productivity and reduced costs. The over-all result has been that incomes of Western European food producers generally have apparently been maintained at favorable levels compared with prices of goods farmers buy, both absolutely and with pre-war. This has been due largely to a substantial and sustained rise in European agricultural output, although possibly no more rapid than in the same period after World War I. Between 1948 and 1951, food production in the OEEC countries increased one quarter, not only making good the wartime losses but nearly catching up with the growth in population since the war.

⁴ These higher prices are explained in part as being due to the superior quality of the home produced products. For a time after devaluation, wheat prices to producers in the United Kingdom were below import prices.

In a number of European countries, including the United Kingdom, Sweden, and Switzerland, one declared objective has been to raise incomes of workers in agriculture nearer to those of comparable industrial occupations. This objective has been best attained in the United Kingdom.

In many exporting countries, the post-war efforts have been more to stabilize farm incomes than to raise them. Examples are Canada, and in the marketing boards of less-developed regions, such as those exporting cocoa. In good years a portion of returns from exports is set aside as a reserve to be used for maintaining producers' incomes in subsequent periods of lower prices. This may delay and attenuate the effect of short supplies and high international prices in stimulating subsequent increases in production, but it also helps check internal inflation. In some undeveloped areas, marketing boards have had the further objective of raising farm incomes by eliminating private speculation and reducing marketing margins.

In other exporting countries, the greatest efforts have been to divert income from agriculture, or to stabilize income by reducing the windfall effect of short period upsurges in international prices, as with cotton or wool prices in 1950-51. Illustrations are exporting arrangements for wheat and corn in Argentina (recently much relaxed), rice in Thailand and Burma; cotton in Pakistan and Egypt; copra in Indonesia; jute in India; and oilseeds, coffee, cocoa, and cotton from various African territories. The funds have been used for ordinary government purposes, economic and agricultural development, and agricultural research or services.

Before examining ways these measures may have affected incomes, production, and consumption in exporting countries, inter-governmental arrangements also must be mentioned. These include the maze of bilateral trade agreements, particularly advance purchase contracts; and multi-lateral economic arrangements ranging from the activities of the IEFEC and the Wool Stabilization Pool to the more formal international commodity arrangements for coffee, tea, and wheat.

Pressure for international advance purchase contracts, especially by the United Kingdom, the major food importer, was in part a consequence of

POST-WAR WHOLESALE PRICE LEVELS, IN PER CENT OF PRE-WAR
(Adjusted for changes in exchange rates)

1937-39 Average = 100

	1945	1947	1951
United States	132	184	220
Canada	128	158	229
United Kingdom	135	154	177

Source: *International Financial Statistics*

war and post-war general price policies. When the United States largely abandoned price control shortly after the war, U.S. price levels advanced sharply, much more rapidly than in the U.K. or Canada. In 1947, both Canadian and U.K. price levels were around 15 per cent lower than those in the U.S. compared to pre-war. By 1951, Canadian price levels had advanced in line with the U.S., but the U.K. wholesale price levels were still 20 per cent below the U.S., as compared with pre-war.

The United Kingdom was able to maintain this lower internal level of prices in part by arranging for purchase of much of its imported supplies, especially those from its dominions and from other countries almost completely dependent upon it for export markets, at prices well below those in commercial markets. This also helped reduce the U.K.'s shortage on its balance of payments. Trade habits developed during the war-time period of exclusive buying under the Combined Food Board, facilitated this post-war development. This whole situation resulted in wide discrepancies even as late as 1952. Examples were export steers selling at \$15.55 in the Argentine and \$16.03 in Ireland; and home bred steers selling for \$19.35 in the United Kingdom, while the Canadian farmer was getting \$28.72 and the U.S. farmer \$39.35 (all per cwt.).⁵ (In coffee and cocoa purchases 1942-1945, the U.S. price controls exerted a similar influence in holding down import prices, with subsequent shortage of supplies). Hog prices in the U.K., however, were at levels comparable with those in the U.S.

At the same time that many British food imports from sterling area producers were being bought at prices well below competitive world market prices (or prices in other potential exporting countries), the pre-devaluation prices of British industrial exports were one-quarter higher than U.S. prices of the same items.⁶

The International Wheat Agreement, contrary to expectations when it was signed, has also tended to hold down prices to exporters, with non-agreement sales moving at prices well above agreement sales.

Apparent Effects on Production and Consumption

Combined effects of international and domestic measures in certain exporting countries selling rice, cotton, copra, and jute, show that export prices received have been little affected by long-term contracts, and the price is that resulting from world supply and demand conditions. (In Burma, however, three-quarters of the export rice now moves at agreed government-to-government prices somewhat below world market prices.) Government export monopolies or controls which, in effect, exact a heavy

⁵ *Commonwealth Economic Committee Intelligence Bulletin*, May, 1952, p. 34.

⁶ *Economic Survey of Europe in 1949*, Economic Commission for Europe, Geneva, 1950, p. 151.

export duty, or the setting aside of reserves for future disbursements, often reduce producer and consumer prices to levels substantially below world market prices. Prices of farm supplies and of alternative food supplies such as imported wheat flour, are meantime determined by world market conditions and the International Wheat Agreement. As a whole, prices to farmers probably are reduced relative to their costs of production and of living, and the incentives to expand production are thereby lowered. Prices to consumers are reduced, relative to costs of alternative goods, and domestic consumption is encouraged despite the scarcity of the export products in international markets. Even in some of the rice importing countries of Asia, such as Ceylon, the subsidization of rice prices to consumers may tend to produce this same perverse effect of increasing consumer demand for a scarce product, and so may maintain the unwillingness to use less expensive substitute foods, such as wheat, and the dissatisfaction with the limited rice rations. It is difficult to guess how far the post-war acute rice shortage is affected by these price policies due to the absence of data needed for such analysis.

In certain countries exporting beef, bacon, dairy, and poultry products; sugar; and wheat (before the International Agreement), the situation is more complex. For considerable periods after the war, their export prices to the United Kingdom, under long-term contracts, were substantially below world market prices or below the prices which might otherwise have existed. At the same time, prices of their imported goods and industrial products were at or above those determined by world market conditions. Prices to their own producers were further reduced by export arrangements and multiple exchange rates discriminating against farm product exports. Prices to farmers thus were held substantially below those that would otherwise have prevailed, and below those of goods farmers purchased. In Argentina, they were also forced below those of alternative farm products for domestic consumption. Part of the persistent decline in acreage devoted to export crops may have been due to these influences, although other factors—droughts and the unusually high price of wool—no doubt contributed.

At the same time, domestic consumption of these products was encouraged by the low price to consumers, held well below world price levels. In Argentina, there were further measures to "subsidize" domestic prices of beef to consumers below the export value equivalent, so as to provide cheap food to industrial workers. Both in Australia and Argentina, proverbial heavy consumers of meat, total domestic consumption has increased materially, and consumption per capita has remained far above that in countries with much higher real incomes per capita. Close study would be needed to estimate how far the increase was due to growing population and rising real income per capita, and how far to

the low domestic prices. Certainly the experience of other countries, including the U.S., suggests that the increase of domestic meat consumption in these countries would have been less if retail meat prices had not been held so low since the war.⁷

Space does not permit a similar analysis of the combined effect of domestic and international price policies on other export supplies to the U.K., notably from Denmark and Holland, but the possibility is that somewhat similar situations may have existed. Meantime, in the United Kingdom itself, consumption of meat and many other staples was limited by rationing, and the control of consumption by price was largely eliminated. The distribution of consumption within the population has become much more equalized, except for the less important unrationed items. During the last year, the policies described have been relaxed to some extent, both in the United Kingdom, and in the exporting countries, towards permitting more play for world market influences.

As a whole, the United Kingdom price policy during and since the war, dominated by the effort to prevent inflation and meet exchange shortages, in combination with the price policies of exporting nations, may have served to discourage production and encourage consumption in the meat exporting countries, and to increase the intensity of demand in England. Price policies may thus have been responsible in part for the very decline in exports and scarcity of supplies which has become such an increasing worry to the importers. In wheat and corn price policies may have had some of these same effects, but to a much less marked degree. The effect has been modified both by the presence of the International Wheat Agreement and by the availabilities of supplies from North America, though for dollars and at the constant threat of impairment of gold reserves. It would seem that only to the extent that domestic price and subsidy policies have helped to increase United Kingdom domestic food production, have these policies worked in the direction of lessening rather than intensifying United Kingdom food difficulties.

In the great of Europe and Asia now under Communist control or influence, price policies have been only one minor aspect of the drive for full socialization and collectivization. The official programs of stimulating and supporting economic development in agriculture have often been accompanied by harsh measures against farmers, including forced deliveries or seizure of supplies at prices far below costs of industrial goods farmers buy, or sudden drives for collectivization which have intimidated peasants and discouraged production. More recently, with increasing

⁷ In Argentina, meat production increased gradually from 1944 to 1949, but consumption expanded rapidly, rising from 45 per cent to 75 per cent of total meat production. *Foreign Agriculture Circular*, FLM-7/50, OFAR, U. S. Department of Agriculture, November 20, 1950.

supplies of industrial products and declining prices of these and other supplies, the stimulus to expand farm production may have become greater. There are signs, however, that many of the satellite countries such as Roumania and Czechoslovakia have been exploited as colonies, with heavy demands for exports to the U.S.S.R. and relatively little returned to them. To what extent price policies, deliberately used or accidental, have contributed to these developments is unclear. As a whole, however, it appears that food production and consumption and international trade in farm products have both risen within the Soviet sphere, while the net exports to Western Europe, previously important for both grains and meats, have continued below pre-war levels. A recent development is the adoption in 1951-52 of more liberal economic policies in Yugoslavia, with fairly complete restoration of a free price system. If these new policies are continued, they may throw interesting light on how public or cooperative ownership will work in conjunction with price-regulated production and consumption.

In Latin America, excluding Argentina, price policies have been quite varied. With their stronger economic position gained during the war, greater direct U.S. financial help, and food supplies generally more abundant than in other under-developed regions, few of these countries have been driven to impose export taxes or the equivalent on their agricultural exports, as has been done so much in Asia and Africa. In some cases, as in Cuba and Brazil, domestic policies have been adjusted to complement international commodity arrangements. In Mexico, Chile, and Uruguay, wheat imports are handled by a government monopoly, and in these and other countries there are variable exchange rates, which are manipulated to subsidize food imports; or, in the case of Ecuador, to subsidize rice exports. With their relatively weak administrative systems, however, few Latin American countries have attempted the direct control of agricultural prices, or general procurement of production from farmers through public hands, used in so many other countries during and since the war. The sustained increase in food production in Latin America since the war seems due more to other causes than to price policies as such.

In certain countries which have suffered extreme inflation and monetary instability since 1940, the effects of these monetary developments have been over-riding in their influence on agriculture.

Greece is one classic case. Here, with recent post-war price levels over 400 times pre-war ones, distributive and service costs have increased far faster than city or farm incomes. In 1946, prices of food to city consumers, and of industrial products to farmers, had both increased about twice as much as farm prices.⁸ With subsequent continued inflation, much the same

⁸ Report of FAO Mission for Greece, FAO, Washington, 1947.

situation apparently still continues despite the reduction of direct taxes on food. Agricultural production has remained low, and the traditional Greek exports, tobacco and dried fruits, have not regained their pre-war markets. Other countries which have suffered hyper-inflation,⁹ such as China, Bulgaria, and Poland, may show similar post-war maladjustments.⁹ Countries where inflation was checked below such astronomical levels, such as France and Italy, show the more traditional results of expropriating from propertied middle classes and of benefiting primary producers, and have been better able to maintain the position of their farmers by other conscious price policies. In any systematic examination of the economic results of post-war farm price policies, careful attention would need to be given to the presence and extent of inflation in each country, and its interrelation with the price policies, rationing, required deliveries, and other related measures employed.

In this discussion, the emphasis has been given to national price measures affecting farm products important in international trade. Measures affecting farm products for domestic consumption constitute, in part, another story. Thus in the marketing of fluid milk, with its rigid prices and quasi-monopolistic possibilities, many Western countries have followed the same trend as the United States, giving legal protection and sanction to the monopolistic control of milk markets and fluid milk sheds earlier built up by cooperative organizations, with resulting greater stability of returns to producers, and lag of milk prices behind other prices. Where prices of most products to farmers are established by an over-all official review or action, as in England and Sweden, income and expenses on farm production considered in setting prices of domestic products as well as of other products. In other cases—as in France, and to some extent Italy, and in many Asiatic countries—price measures for products influenced by imports or exports may be quite different from those affected solely by domestic market conditions.

General Conclusions

This discussion has led to the construction of an hypothesis, not a demonstration of a firmly supported conclusion. On the basis of this hypothesis, however, and on the scattering of general information which supports it, one result emerges of special interest to this audience. United States farm price policy has often been criticized as being unnecessarily favorable to farmers, and as supporting farm prices of wheat, for example, at levels far above those necessary in view of improvements in technology and declining production costs. Farmers' returns may have been higher than necessary, and these may be capitalized into unnecessarily high prices of farm land. For the short run of the past two decades, and viewed in this pano-

⁹ *Report of FAO Mission for Poland, FAO, Washington, 1948.*

rama of commercial world agriculture, American farm price policy has worked, and has helped encourage an expansion of farm production almost unique in the world (except for the U.K. and post-war New Zealand).

In the United States, expenditures on agriculture constitute a substantial sum from the federal budget, and supported farm prices keep food costs to non-farm consumers somewhat higher than they would otherwise be. Similarly, in the U.K., and Switzerland, farmers are heavily subsidized, directly and indirectly. Undeveloped countries cannot afford to subsidize agriculture as generously, for their national income and public revenue both depend largely on agriculture itself. On the contrary, in many poorer and less-developed countries, levies on agriculture through price measures or taxes provide a substantial part of public revenues and greatly exceed expenditures directly for agriculture. Even in so well-to-do a food exporting country as Canada, it is felt that the rest of the country cannot afford to subsidize agriculture.

Countries less well endowed with industrial resources or national income than the U.S., U.K., and Switzerland are thus not able to use such generous price policies for their farmers to encourage a more rapid increase in food production.

In establishing food price policies, many countries must reconcile and strike a balance between the conflicting objectives of increasing consumption and making it more equal, and of encouraging larger farm production. A number of countries, wearying of the difficulties of public control or intervention, have recently been relaxing their price control, or import, or export price regulation policies, and allowing greater influence to world market forces. Others are modifying their price policies to give greater incentives to their farmers for increased output.

Students of pricing policies should give more attention to examining the effects upon consumption and upon production of the price policies followed. This will require careful quantitative work supplementing good descriptive analysis of the administrative, economic and legal arrangements. Intensive and critical analysis of national and international price policies along the lines suggested in this paper may indicate other points where they need to be modified in the interest of larger or better balanced food production and consumption. The future work of students of these problems including that of the FAO secretariat, will, we hope, contribute to achieving the FAO goal of enough to eat for all men, everywhere.

NOTE

There has been a notable series of articles over the past two years in *This Journal*. Besides these, the following articles on agricultural developments and price policies in various countries, may be of interest.

Lazar Volin, "Soviet Agriculture Collectivism in Peace and War," *American Economic Review*, May, 1951, pp. 463-474.

A. W. Ashby, "Agriculture and Free Market Systems," *The Farm Economist*, Oxford, December, 1951, pp. 337-343.

National Farmers Union, "Results of the Special Price Review, 1951. Information Service, Vol. VII, No. 1, London, January, 1952.

Ruth Cohen, *Survey of National Measures for Stabilizing Farm Prices in Western European Countries*, first draft, FAO, Rome, April, 1952, 107 pp.

Nicholas Kaldor, *A Reconsideration of the Economics of the International Wheat Agreement*, FAO Document CCP 52/19, Rome, April, 1952, 44 pp.

Pierre Sinard and H. Jacoby, "Recent Changes in the Structure of Farm Prices in Western Europe," to be published in *FAO Monthly Bulletin of Economics and Statistics*, 1952.

See Also: Arthur Hanau, "Price Problems on the Agrarian Market," *Archives of the German Agriculture Society*, Book 3, Dusseldorf, 1949.

E. M. H. Lloyd, "The Logic of National Policies for Promoting and Regulating Agricultural Production" (in Europe); address to 8th International Conference of Agricultural Economists, East Lansing, Michigan, August, 1952. (To be published in the conference proceedings.)

E. S. Schlange, "Die Subsidierung von Ernährung und Landwirtschaft in Grossbritannien," *Hefte fuer Landwirtschaftliche Marktforschung*, Hefte 3, Institut fuer Landwirtschaftliche Marktforschung an der Landwirtschaftlichen Forschungsanstalt, Braunschweig-Voelkenrode, Verlag Paul Parey, Hamburg und Berlin, 1949.

DISCUSSION

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Ministry of Food, London

I should like to pay tribute to Mr. Ezekiel for his paper, which is something of a *tour de force*. Rarely, if ever, have we been given so comprehensive a survey of food price policies covering so many countries of the world; and we shall look forward to the more detailed studies that are now being undertaken by F.A.O.

Mr. Ezekiel emphasizes that food price policies involve striking a balance between conflicting objectives, in particular between keeping prices at a level which will not put up the cost of living and fixing them high enough to satisfy producers and encourage increased production. His hypothesis, as I understand it, is that since the war, or at any rate since Korea, prices have been stabilized at too low a level. Governments have been mainly influenced by the objective of stabilizing prices and farm incomes, and this may have discouraged production. I doubt whether this generalization is altogether valid. It may be true for special cases—for example, O.E.E.C. has in the past drawn attention to the low prices fixed for wheat in Austria and some other European countries. It is surely not true of the United States, where farm price support has kept prices relatively high and profitable.

I detect a tendency to treat U.S. prices as the norm, or even as the equivalent of "world market" prices. But there is no free world market in the U.S., at any rate for livestock products; if there were, U.S. would be importing butter, cheese and beef in large quantities. Barriers to trade combined with price support tend to lift U.S. farm prices and depress them elsewhere.

In the United Kingdom, guaranteed prices are designed to insure expansion of production by reducing the risk of the market and maintaining farm incomes. At the same time food subsidies—now reduced from £415 million in 1951-52 to £309 million in 1952-53—help to stabilize wages and regulate

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consumption. In the case of milk, for example, about £100 million goes to fill the gap between the price needed to bring about the increased production aimed for, and the subsidized price needed to insure the increased consumption (now 60 per cent above pre-war), which is considered desirable for public health.

Except in the case of bread and flour no large subsidies are given to imported food. The policy has been to guarantee overseas producers against the risk of falling prices by long term contracts; until the outbreak in Korea, producers in New Zealand and Denmark were well satisfied. Since then prices have been raised to the full amount provided in the contracts, and even beyond, with the express aim of encouraging production. In the case of tea, there has been decontrol and market prices have shown a tendency to fall.

The countries that best illustrate Mr. Ezekiel's thesis are Argentina and to a less extent, Australia. In both there has been a desire to prevent internal food prices rising. Part of the proceeds of sale for export has been withheld; in Argentina a low peso exchange rate has been fixed for exports, e.g., 14 pesos to the £ for meat compared with 39 pesos for ordinary remittances. The result, as might be expected, has been increased home consumption and some setback to increased production.

Rice production, especially in Burma, might have been higher if there had been no government intervention by way of price control and allocation. But it is surely incorrect to say that in Ceylon, the consumer subsidy for rice has "increased demand," when effective demand has been limited by rationing.

In general, I think Mr. Ezekiel has performed a valuable service in drawing attention to the dangers of fixing prices too low and thus discouraging production. Until recently the main preoccupation of producers has been fear of a slump and the remedy proposed has been stable prices. But if the prices of other products like wool fluctuate widely, stable food prices, e.g., for wheat, will at times be relatively unattractive. In other words, it is the excessive instability of other prices rather than the stability of food prices which needs to be corrected. This, of course, is part of the general problem of controlling inflation.

In conclusion I would suggest, as an amendment to Mr. Ezekiel's hypothesis, that increased food production has been hampered by uncertainty and instability of prices in general, by inflationary tendencies and the measures taken to counteract them, and, above all, by excessive obstacles to trade at national frontiers.

U.S. FOREIGN ECONOMIC ASSISTANCE AND THE DEMAND FOR AMERICAN FARM PRODUCTS

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AMERICAN foreign economic assistance has now entered its fourth phase within the last dozen years. The first phase, represented by the Lend-Lease period, was designed to aid our allies in the prosecution of the war. The second phase was that of relief and rehabilitation to overcome the more immediate effects of the ravages of the war. During this period, our assistance was as equally generous to our former enemies as to our allies. The third phase was economic reconstruction—a period of approximately three years, 1948-50. In this period, our objective was to create a situation of economic strength and vitality in Western Europe. During the last year, the great bulk of our foreign assistance has been utilized to build the military strength of our friends and potential military allies. This phase started before the passage of the Mutual Security Act of 1950. It had a relatively small but significant beginning in the military assistance programs for Greece and Turkey. But by the end of 1950, military assistance was on its way to eclipse economic assistance.

Many of us had hoped that by the end of 1950 or 1951, our foreign economic assistance could have entered a new phase—that we could have launched the bold new program to substantially improve the economic well being of peoples in the underdeveloped areas of the world. This was a task that appealed to our humanitarian ideals and challenged our imagination. But the political and military situation of the world today, rightly or wrongly, has turned our efforts in a very different direction.

The different objectives of the assistance program on which we are now embarked, and the one which we might now have had well underway, have entirely changed the character of that assistance. The change has been of two sorts. The great bulk of our assistance is now going to the nations of Western and Southern Europe and the Middle East; most of the aid is going to the relatively rich areas of the world. The other important difference is the specific content of the aid itself, now consisting of military end-use items or of imports that will contribute to increasing the military strength of the recipient nations. Were it possible to emphasize economic development, the same amount of aid would have had very different effects upon the composition of world output and the characteristics and direction of world trade.

In early 1950, there was a reasonable presumption that Western Europe was in a process of continuing recovery in internal production, had achieved

economic stability, and would soon achieve rough equilibrium in external trade that would eliminate the need for further dollar aid within another year or two. Had the Korean War not occurred and had the United States embarked upon an extensive program of aid to the underdeveloped areas of the world, the demand for exports from Western Europe would have increased substantially and the significant diversion of many raw materials to the U.S. military establishment would have been avoided. Despite the important advances in agricultural production in Western Europe since the end of the war, these circumstances would have resulted in a continuing strong demand for our agricultural exports. But the new source of demand for the output of Western Europe is not the growing capital needs of underdeveloped areas as it might have been, but an expanding military machine. The output of this machine is not rising levels of living, more and cheaper raw materials, or an economically productive outlet for investment. While its output may be very valuable in maintaining peace and assuring the security of Western Europe, the military machine constitutes a real drain upon the productive resources of the area.

ECA Surplus and Export Subsidy Provisions

I am not in a position to predict the effect of our foreign assistance program for the current year upon the level of our agricultural exports. In fact, I find it impossible to indicate what the effect has been in the past four years. Any specific prediction would assume knowledge of the level of economic activity in the rest of the world and the United States and the ability and willingness of the world to import from dollar areas in the absence of the dollar aid by our nation. This knowledge I do not have and consequently I will make no attempt to indicate the over-all effects of dollar aid upon agricultural exports. Instead, I shall try to do two things in this paper. I want to discuss whether the administration of economic assistance during the past four years has especially favored agricultural exports from the United States. It is more difficult to describe briefly my second undertaking. During the next few years, the general nature of our economic and military assistance can have an appreciable effect upon the composition of the national product of Western Europe and thus upon the character of imports of this area. An important policy question that arises turns on whether our actions should increase the reliance of Western Europe upon overseas supplies of food and agricultural raw materials. It is this general point which I wish to discuss in the latter part of the paper.

The Economic Cooperation Act of 1948 contained two provisions, which are still in effect, that were designed to encourage exports of U.S. agricultural products. First, if the participating country requested procurement, requiring the expenditure of dollars, of any agricultural commodity declared surplus to domestic needs by the Secretary of Agriculture, that

commodity had to be obtained from U.S. sources. Second, the Secretary of Agriculture was authorized to pay an export subsidy in amount up to 50 per cent of the domestic market value of the product.

On the whole, the experience of the past four years indicates that the first of the provisions was not very effective and the second was used with considerable restraint by the Secretary of Agriculture. The record has been much better than many of us feared, though it must be admitted that in some instances the use of export subsidies has had undesirable political and economic consequences.

Approximately five billion dollars of the assistance provided to ECA nations from April, 1948 to June, 1951 was used to purchase food, feed, cotton and tobacco, of which about 80 per cent was purchased in the U.S. The surplus commodity provision was applied to all but 150 million dollars of the agricultural commodities procured by ECA countries with ECA funds. Without knowing the details involved, I would argue that the surplus provision was not particularly effective in increasing U.S. agricultural exports. Agricultural products were certainly purchased from non-dollar areas before dollar areas; consequently, any favoritism for our agricultural exports would have been within the dollar area. During this period, the ECA nations (excluding overseas territories) had dollar earnings from exports to the U.S. exceeding four billion dollars. These dollars were not subject to this provision and could be used to purchase any commodity anywhere in the dollar area. Thus, it is probable that most countries did not request procurement of any surplus agricultural commodity unless this represented as good a buy as could have been obtained elsewhere in the dollar area. During the period the nations involved purchased about 50 per cent more agricultural products from the U.S. than was involved in the procurement authorization. Some excess purchases were found in every major category of agricultural products except wheat. However, I do not believe that wheat exports were increased by the surplus commodity provision. Roughly a third of the total wheat procured was obtained from Canada, and the United States is the only country that has had significant carryover of wheat in recent years.

It should also be noted that the subsidy provision has been held within fairly reasonable bounds. The total subsidies paid within the framework of the assistance programs since early 1948 from Section 32 funds has been less than \$75,000,000 and in each year considerably more could have been spent had the Secretary of Agriculture so desired. While one might say that the inclusion of the subsidy provision in the original legislation was unfortunate, even though it did not give the Secretary of Agriculture any powers he did not already have, the restraint shown in its use should be commended. This is not to deny that on occasion the use of export subsidies has created friction between the U.S. and friendly nations.

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Instances of friction arose because of export subsidies on dried fruits, for example, and other instances could be given.

Direct Military Aid Versus Dollars for Imports

At the beginning of 1948, the view was fairly widely held that economic assistance of the kind envisaged in the Marshall Plan would have a fairly definite termination date. At that time, the fiscal year 1951-52 was viewed as the probable end of the period and in a peaceful world this expectation would not have been in substantial error. The present undertaking, however, cannot be considered in so optimistic a view with respect to its terminal period. It is possible that continued aid by the United States and its continued acceptance by friendly nations will be viewed as desirable on both sides for many years. If wide-scale war does not occur, but the threat of such an event continues, we may believe that continued economic and military aid minimizes the cost of preventing or resisting aggression. Similarly, the receiving nations may feel that the gains to them in increased economic viability and defense strength are sufficiently important to continue to accept the aid, even though most of the nations probably resent the interference with their domestic affairs that flows from accepting the aid.

If such aid is to continue for several years, and it might not be unreasonable to plan in terms of a decade, the type of aid given can have a significant influence upon the structure of the European economy. As a basis of discussion, though at the cost of over-simplification, there are two polar types which our aid could follow. One type would require that the aid take the form of military end-use items to the exclusion of all other types. The other type is that the aid should involve a relatively free grant of dollars, predicated on the achievement of a given level of military strength by each of the participating nations.

These two positions are not entirely straw men. On the one hand, there are influential persons in the American Congress who would like to eliminate all of the so-called economic aid from the Mutual Security Act funds. It is not clear that they would insist solely upon the export of military items from the U.S. but there is a strong presumption to this effect. On the other hand, certain groups, including the American Farm Bureau Federation, would prefer to have most of the military items produced in Europe and the aid given as unrestricted dollars to be used to cover general import needs.

The Mutual Security Act of 1952, as one might expect in these United States, is a compromise between these two views. It involves both the export of military end-use items and the grant of relatively unrestricted dollar exchange. It is not entirely apparent from the plans made available to the general public the exact or even the approximate proportions in which

the aid will be divided between these two categories. Part of the confusion arise because of the relatively evasive terms used to describe the types of aid—direct military aid and defense support. Defense support—a politically neutral term for economic assistance—is designed to provide those imports which the recipient nations need to expand the proportion of their national output going to the military effort. This support is predicated on the reasonable assumption that in Western Europe military production competes very directly with exports.

Direct military aid is not entirely what many assume it to be—exclusively consisting of the export of military items produced in this country. Thus far, it has been that in large part, but there is nothing in the legislation requiring that direct military aid take this form. Direct military aid can take the form of off-shore procurement—the purchase of military items with dollars in the participating nations and the transfer of title to the items to the nation where purchased or one of the other nations receiving aid. Consequently, the classification of aid by the categories of direct military aid and defense support are of little value in delineating the impact of the aid on the structure of industry in Europe and the composition of their imports. The important consideration is the manner in which the direct military aid is utilized.

Off-shore procurement, if carried out cooperatively with the participating nations, can have the same effects as direct dollar grants. This assumes that the military objectives are clearly defined and would be achieved in either case. The important question is whether it is desirable to eliminate most of the exports of military end-use items from the United States. While I am in no position to give a definite answer to this question, I believe there is some value in discussing the major issues at stake.

A major consideration is undoubtedly that of the risks involved in creating efficient production facilities for military goods within striking distance of the Russian armies. If the short-run military strength of Western Europe is not greater under one policy than another, the prize offered to a successful attack would be increased. But surely in the long run, the European members of the Atlantic Community will feel more secure if they have the plant, equipment, and industrial organization to produce their own supply of military equipment.

A second consideration is the political one of relations between Germany and the rest of Western Europe. It is in Germany that the possibilities of creating production facilities for military goods probably are the greatest. Germany has the skills, steel mills, chemical factories, expert technical knowledge, and a significant degree of unemployment. If the additional capital were provided for plant and tools and the funds for imported food and raw materials required by the increased industrial output,

it is not unreasonable to assume that Germany could soon be the major producer of military goods in Western Europe and might move ahead of England within a fairly short period of time. Thus Germany might again become the dominant military and political force in Western Europe, a possibility that France hopes can be avoided and which the United Kingdom might not willingly accept.

A third difficulty—related to the second—is that we may not be able to avoid the unification of Germany under conditions that would make it possible for Russia to achieve political domination. If such unification were to occur after we had created an extensive modern military production organization, the loss to the West and the gain to Russia would be of enormous significance. In the longer run, the combination of the German industrial machine and the Russian manpower would be disaster to the rest of Europe and to us in any case. But, if a ready-made military enterprise were available in West Germany, the consequences of the disaster would be realized much sooner.

A fourth factor is that in both France and Italy, the internal political situation is still sufficiently in a state of flux to create a risk that their output of military goods per dollar invested would represent inadequate return.

These four considerations, and there may be others of a similar nature, may partially explain why we may not provide the bulk of the military aid under the guise of off-shore procurement or directly as economic assistance. An implication of the previous paragraphs is that the output of military goods per dollar expended would be greater if these dollars were spent in the recipient nations rather than in the U.S.

The assertion is made repeatedly that a dollar spent for military goods in Western Europe will buy as much as two or three dollars spent in this country. This comparison may be valid, though I have not seen it documented sufficiently to provide a convincing case. If it is true, it means that production of military items in the United States is much less efficient relative to the production of durable goods generally than in Western Europe. Though most of us might readily admit that military production is less efficient than non-military production in this country, military organization and procurement policies are probably subject to about the same criticisms the world over. It is true that the industrial organization of Western Europe is better adapted to the production of smaller numbers of identical or similar items than is our organization. And it is probably true that in the production of aircraft frames, tanks, ships, and guns, we do not have the advantages that accrue from the use of production line methods so successfully adapted to a wide array of civilian durable goods. If relative shipbuilding costs provide a reasonable basis for comparison, the two- or three-to-one ratio does not seem too fanciful for many

types of military goods. For motor transport (sans power steering and automatic transmission) and small guns and firearms, the advantage in cost might well be with U.S. production.

Despite these comments of doubt concerning the high ratio of return on dollars spent on military production in Western Europe, I would still argue that an economic gain would accrue to the Western nations by using the great bulk of our military aid to expand the production of military goods in Western Europe. The reason for this view is that present plans call for a much higher proportion of American industrial production being devoted to military production than is true in Western Europe. During the present fiscal year at least 10 per cent of our national output will be military goods; in Western Europe the percentage will be less than three.

In 1952-53 military production in Western Europe, according to present plans, will be about 3.6 billion dollars. While this is three times the rate achieved in 1950-51, it is a substantially lower rate of production than the West Europe industrial machine can produce. The industry of one great nation, Western Germany, is now producing no military goods of any consequence. In both Germany and Italy, there is a substantial degree of unemployment. France has plane production facilities not now being used because of internal financial difficulties and problems arising out of her balance of payments. Churchill has said that Great Britain must export arms in order to maintain full use of her military production plant.

Expanded military production in Western Europe financed through off-shore procurement (but made available to the NATO army) is not only possible, but it would supply at least a short run palliative to the important foreign exchange problems of the area. During the present fiscal year, Western Europe will get approximately 1.3 billion dollars from economic assistance and payments for off-shore procurement from the U.S. If this were expanded to at least four billion dollars, the effect on the economy of the area would be substantial.

The question of the location of military production can and should be divorced from the issue of payment for the production. Few of us can quarrel with the present distribution of the defense burden between the U.S. and the major European countries. While our defense budget constitutes a larger percentage of our national income than is true of any Western European country, the difference is not very large for the major nations and a significant part of the difference is due to the relative high rates of pay to military forces in the U.S. forces. The point that I wish to emphasize is that full consideration should be given to the use of our military and economic aid to develop military production in Western Europe rather than to further increase the direct demands upon our own military production. As I indicated earlier, there may be important military and political

reasons for not following such a policy, but there are probably no very strong economic objections against it.

Effects of Increase in Dollar Exchange

If all of our military aid were given to Western Europe in the form of off-shore procurement, it would mean an increase in dollar exchange of at least three billion dollars a year for the next several years. This amount is equal to about three-fourths of the current level of dollar earnings of Western Europe and would permit a substantial increase in the volume of imports from the dollar area.

Undoubtedly some of the increased dollars would be used for additional food imports. Some of the food imports from the dollar area might replace the imports now coming from Eastern Europe; others would be used to increase the general level of food consumption. I doubt very strongly whether additional food imports would be required because additional military output resulted in a diminution of food output in Western Europe. While a diversion of resources from agriculture to the rest of the economy has been in the past and would now be an economically advantageous move if this were a peaceful world, no government of Western Europe is now going to voluntarily reduce its domestic production of food. In fact, some of the dollars would probably be used to import fertilizer and feed stuffs as a means of increasing agricultural production. It is difficult for those of us who have never been hungry or faced the prospect of several years of a limited and unvaried diet to understand the psychology of those who have.

Another reason for doubting that the additional military output would cut into food supplies is that the gross productivity of manpower, particularly in industrial production, is increasing at a fairly rapid rate in Western Europe. The ECA believes that in Western Europe industrial output per man hour increased by about 10 per cent between 1950 and 1951 and employment increased at the same time. Further increases in employment, without reducing agricultural output, are possible, particularly in Germany and Italy but also in the United Kingdom, Belgium, and Denmark. Additional increases in industrial output will result from capital investment and changes in technology. Furthermore, there can be no question that industrial output is now being held back by the lack of convertibility of European currencies and the type of physical planning that is required to ration the scarce imports from the dollar areas. The availability of three billion dollars for free expenditure would surely permit relaxation of many of the current controls over dollar imports, at least over industrial materials if not food.

Summary

This paper has failed to provide an analysis of the effect our foreign assistance programs had upon the demand for American farm products. I hope that the paper has pointed up some of the more important economic issues involved in the general nature of our military and economic programs in Western Europe and the Near East. The present degree of emphasis upon the export of military end-use items fails to contribute to the major economic problems of the receiving countries. While off-shore procurement and the grant of free dollars would contribute substantially to the economic viability of Western Europe and, for the same expenditure of dollars, result in greater military strength some two or three years hence, I am not in a position to appraise the political and military arguments against the procedure.

DISCUSSION

DON KALDOR
Iowa State College

I was disappointed to find that Dr. Johnson had decided not to discuss the assigned topic. The problem which has been posed is a significant one, and it needs to be analyzed by a person with his professional competence. Moreover, I was a little surprised when I noted that his reason was the inadequate state of existing knowledge of economic relationships. It is well known, however, that in the past Dr. Johnson has undertaken to analyze other problems of comparable perplexity without benefit of any more knowledge of economic relationships than is available in this case. Furthermore, his analyses have been among the outstanding contributions to the recent literature in our field. All this made me wonder whether Dr. Johnson was becoming somewhat more cautious with the passage of time.

Actually he limited his discussion to a consideration of two factors bearing on the demand for farm products: 1) the provisions in foreign aid legislation designed to encourage agricultural exports, and 2) the future distribution of military aid between off-shore procurement and the export of American-made war materials.

In his preliminary remarks, Dr. Johnson makes reference to the hope that we could embark on a program of sufficient scale to substantially improve the economic status of the peoples in the underdeveloped areas, but that the political and military situation in the world today has turned our efforts in a different direction. We should not lose sight of the fact that the basic urge experienced by the American people to aid the under-developed countries does not stem from humanitarian considerations as much as it does from the very factor that has turned our recent efforts toward rebuilding the defenses of the West—the fear of Communist aggression. The real hope is that the expansion of our military strength will prevent an early war and thus provide us with an opportunity to tackle the more basic economic and political problems which provide the source of sustenance for the growth of Communism.

With respect to the effect of the provisions favoring the export of American farm products, Dr. Johnson's conclusion appears to be essentially correct. These provisions have not played a particularly significant role in increasing the demand for agricultural commodities. In the case of the perishable products, the subsidization of exports probably would have occurred on nearly as large a scale in the absence of these provisions, since they were prompted by the accumulation of stocks under the price support programs of 1948 and 1949. In part, this conclusion is supported by the export sales program of the Commodity Credit Corporation and by the program of foreign donations provided for in Section 416 of the Agricultural Act of 1949. If the export subsidy operation had not been carried out under the foreign aid provisions, it would have been done under other existing authority.

One must agree that military aid in the form of off-shore procurement provides a promising short-run solution to the dollar problem of Western Europe. As a consequence, it could be an important factor increasing the future demand for American farm products. There are some points, however, that seem to need further analysis. Dr. Johnson appears to suggest that on economic grounds, all military aid should be in the form of off-shore procurement. Before adopting such a policy, there should be a reasonable probability that this would maximize the gains from geographical specialization by the North Atlantic countries in the production of military and non-military goods. On this point the evidence is not very convincing.

The discussion is not entirely clear as to just how off-shore procurement to the full extent of the planned military aid would make an equivalent amount of dollar exchange available to Western Europe. Unless the existing unused capacity is fully mobilized and output increases substantially, a marked expansion in the production of war materials in Western Europe might mean a further diversion of resources from the export industries and a decline in earnings of foreign exchange. Apparently this is what prompted the recent retrenchment in the British defense program. It is possible, of course, that exports to the dollar area might still be maintained by selective controls over production and exports. If these were not successful, however, dollar earning would decline and this would partially off-set the increase generated by off-shore procurement. Furthermore, in order to appraise the net effect on the supply of dollar purchasing power available to Western Europe, it also would be necessary to take into account the level of "economic" aid provided by the United States.

Western European countries might be reluctant to agree to a large scale program of off-shore procurement if it meant a serious decline in their exports of civilian goods. Since the end of the war, considerable effort has been expended in reviving old and creating new trade connections. Some of the European countries might not relish the idea of losing these markets to the United States or Japan. Over the longer pull, such a loss of outlets might have an important affect on their ability to become self-supporting at a level of living acceptable to their peoples.

Dr. Johnson has presented a well-rounded discussion of the important political and military considerations which affect the decision to expand our off-shore procurement program. The fear of Russian capture of new defense industries, however, is likely to be a factor of declining significance as the military power of Western Europe and the United States continues to expand. I would be inclined to argue that the number one problem in the future will

be Germany. If we agree to unification and fail to successfully combat Soviet methods of achieving political control there seems to be great danger of losing Germany's potential contribution to the defense and well-being of the West.

I would like to mention briefly some of the factors that need to be considered in an analysis of the effects of our foreign aid programs upon the demand for American agricultural products.

Perhaps the most fruitful place to begin such an analysis is with the effects of foreign assistance upon the government's cash budget. One might reasonably assume that, in the absence of foreign aid, personal income taxes would have been reduced by an equivalent amount. An alternative assumption, somewhat less realistic, is that there would have been an equivalent reduction in the volume of bank held debt. While the direction of the effects upon the demand for farm products would be much the same in each case, magnitudes would be significantly different.

Next, one would need to consider the effects of the increase in disposable income, as a result of lower taxes, upon the level of domestic demand for farm products. Some consideration would need to be given to the impact of the tax reduction on the distribution of income. It also would be necessary to trace the effects of the increase in disposable income on expenditure for the non-farm component of current consumption. Here one would need to recognize the difference in the spending propensities of the government and the public. Since private investment expenditure may respond to a change in consumption spending, the relationship between changes in consumption and changes in the level of private investment would need to be examined. An analysis of these factors would provide a basis for appraising the effects of foreign aid upon the level of income in the United States. After such an appraisal, one would need to relate any changes in the level of income to the level of domestic demand for farm products.

In addition, it would be necessary to investigate the effects of foreign aid upon the dollar earnings of countries importing American farm products. These countries have spent substantial amounts for farm products over and above purchases made under the foreign aid programs. Any change in the level of United States income associated with foreign aid would tend to induce a change in the value of American imports. This means a change in foreign dollar receipts on current account. It then would be necessary to relate the change in foreign dollar earnings to the level of export demand for American farm products.

If the effects of foreign assistance on foreign dollar earnings turned out to be fairly substantial, consideration would have to be given to the secondary effects of this on the level of domestic demand. Such secondary effects could be produced by a change in the level of domestic income induced by the change in American exports, associated with the initial change in foreign dollar earnings.

It is apparent from this brief account that an analysis of the effects of foreign assistance upon the demand for American farm products would constitute a research problem of major proportions. Thus one can appreciate the circumstances that led Dr. Johnson to his decision not to discuss the assigned topic.

THE PRODUCTIVE CAPACITY OF AMERICAN AGRICULTURE

Chairman: F. J. Welch, University of Kentucky

LAND RESOURCES FOR INCREASED AGRICULTURAL OUTPUT

BYRON T. SHAW

Agricultural Research Administration

OUR living standards today require that every year almost three tons of food, fiber, and other products of the land be produced for each of the 155 million people in the United States. Food comprises about 1,600 pounds of this total, and fiber for clothing, pulpwood for paper and similar materials about 4,100 pounds. To do the job, the 5.5 million farms are producing at record levels.

The volume is impressive, but demand for agricultural products is increasing. Our population is currently growing at the rate of 2.5 million persons a year. There has been a rise in per capita consumption of food and fiber, with a market shift toward increase in consumption of fruit, vegetables, dairy products, eggs, and meats, which make the heaviest demands on agricultural resources. These demands have been met up to the present, even though there has been only slight expansion in cropland in recent years.

The trend nevertheless gives rise to the question: What is the productive capacity of American agriculture, and is it sufficient to meet the needs of the future?

Several comprehensive appraisals have been made recently. The one I made some months ago,¹ which I am asked to summarize tonight, had a more narrow objective. It was designed to provide a yardstick for measuring the program of research that will be needed. This appraisal is physical rather than economic, and it looks forward to the year 1975—a target date that has been used in other appraisals both before and since. It necessarily assumes that economic conditions would be favorable and holds the export-import factor as a constant.

The intent was to gauge the task ahead purely on the basis of what must be done with the available physical resources to provide food and fiber for the population we will have in 1975.

Estimates of the Census Bureau are that the United States will have by 1975, under moderately favorable conditions, a population of 190 million.

¹ Based on data of January, 1952.

If the present rate of 2.5 million annual increase should continue, the population would be several millions larger. For purposes of the appraisal, the 190 million estimate is accepted.

In any event, it is apparent that the future job for agriculture is of great magnitude. I do not mean to imply concern about people going hungry. I mean to raise the question about our capacity to produce economically on a scale that will provide a national diet at least as good as we now have, both quantitatively and qualitatively.

My purpose is to first review what has been done in the past, and then estimate the probable effectiveness of these measures in years to come.

History of U.S. Agricultural Output

The bringing of new land under cultivation has been a traditional element in our expanding agricultural production. This was the pattern for more than a century as settlers moved westward. By 1880, the first year of records on cropland, there were 188 million acres under cultivation. Population was 50 million. The farm output index, measured on the basis of the 1935-39 period equalling 100, was 47. In the decades that followed, there was a rather parallel development of new cropland with population. Total farm output kept pace also.

About 1920 the parallel lines began to diverge. In that year, cropland was about 400 million acres, population 105 million, and the farm output index 92. In the following years population continued to increase, and by 1950 the total was 151 million. Cropland, however, began to level off. Total cropland in 1950 was 408 million acres; not much different from that of 1920. The farm output index, nevertheless, continued to increase. In 1950 it stood at 138.

What had happened? It was clear that by 1920 new lands could be brought into cultivation only at rapidly increasing cost. But during the 1920's, mechanization began to make itself felt as a farm production factor. Millions of acres that had been used to provide feed for horses and mules were being diverted into providing products for other uses. Release of land from the support of horses and mules continued throughout the 1930's, and is continuing today, but in more recent years other technologies have become increasingly important. These include a wide variety of other production practices involving cultural and genetic improvements.

The importance of technology in farm production today makes it impossible to consider capacity merely in terms of acreage. Technology has become a resource that can be used in lieu of acreage.

We must begin, of course, with land resources, for they are basic. In estimating them, we must take into account the grazing lands and pastures as well as cropland, because a large part of our food supplies comes through the route of livestock. To provide an adequate and uniform

measure, I have converted the acreages that are now or may be used for livestock feed into cropland equivalent. So when I speak of the number of acres available or needed, I mean our present cropland plus the cropland equivalent of the grazing and pasture lands.

On that basis, in the 1935-39 period we had the equivalent of 424 million acres of cropland available to produce food and fiber for domestic human consumption. Acreage needed to produce agricultural exports is not included and it is omitted throughout this analysis.

By 1950 the number of acres available to provide for domestic human consumption had risen to 462 million. This was a net increase of 38 million acres.

In 1950 there still were 33 million acres devoted to growing feed for horses and mules. Release of this land undoubtedly will continue, but we can expect to add at the most only about 15 million acres from this source by 1975.

The other major farmland resource is the irrigation, clearing, and drainage of lands. Examining the estimates of the responsible agencies, and taking into account the extra productive capacity of irrigated lands, it appears that these sources can provide the cropland equivalent of another 30 million acres.

These two items, then, could give us a probable maximum of 45 million acres to add to the 462 million that were available in 1950, or a total of 507 million in 1975. These estimates are probably optimistic because no allowance is made for losses that may occur because of erosion, urban expansion, and other factors.

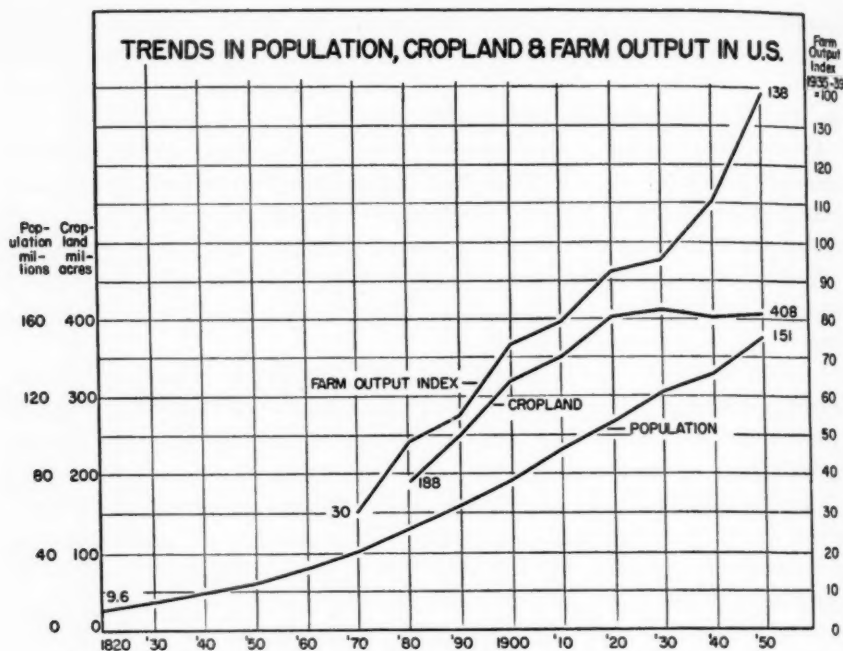
How does the prospective land resource of 507 million cropland equivalent acres compare with the need?

To assure a uniform yardstick, I've expressed the need in terms of 1950 acre-yields. On that basis, during the 1935-39 period, only 360 million acres would have furnished the products that were consumed then, instead of 424 million. The 64-million acre difference is a measure of what was accomplished in terms of improved technology, improved conservation of the land, and other agricultural gains.

It is a coincidence, but an interesting one, that what we gained through improved technology was just enough to feed the increased population of 1950 on a 1935-39 diet. But diets actually improved, both in consumption per capita and in greater consumption of protective foods, and there was an additional gain equivalent to 38 million cropland acres made largely by the release of land from the support of horses and mules, and by irrigation.

Improved Technology Is Key Resource

The increasingly important role of improved technology as an agricultural production resource thus becomes apparent.



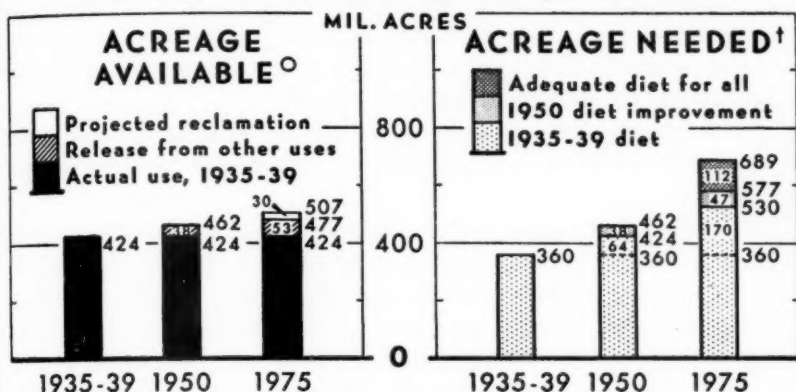
Assuming then that the 1950 diets will be maintained in 1975, for a population of 190 million we will need the cropland equivalent of 577 million acres.

In projecting the requirements to 1975, we have not taken into account the very likely changes in national nutrient requirements that will be caused by an aging population and a more sedentary life encouraged by increasing mechanization. The effects of these trends are difficult to measure or forecast, although it appears certain they will lessen the per capita requirements for calories and put greater emphasis upon the production of livestock products and the succulent vegetables and fruits—foods that take relatively much land and labor to produce.

It is conceded that many people still do not have adequate diets. To provide an adequate diet for all would require an additional 112 million acres of cropland equivalent, or a total of 689 million by 1975. That may be too optimistic a goal. If we assume merely that 1950-1975 improvements will correspond to the gains achieved from 1935-39 to 1950, the additional requirement would be 50 million acres of cropland equivalent, or about 627 million.

Perhaps we should confine the estimates merely to a projection of cropland equivalent in 1975 on the basis of 1950 diets. That, as we have seen, totals 577 million acres, or 70 million more than I have indicated may be available.

CROPLAND* AVAILABILITY IN RELATION TO NEEDS, 1935-39, 1950, AND 1975



* CROPLAND ACREAGE PLUS CROPLAND EQUIVALENT OF PASTURE AND GRAZING LANDS USED FOR DOMESTIC HUMAN CONSUMPTION

○ ACRES USED IN 1935-39 AND 1950 AND ACREAGE PROJECTED AS AVAILABLE IN 1975

† NEEDS AT STATED PERIODS ASSUMING 1950 CROP YIELDS PER ACRE (POPULATION 1935-39 = 129; 1950 = 152; 1975 PROJECTED AT 190 MILLION)

How do we propose to make up this deficit?

We might import more and export less. However, when we consider world conditions the possibilities in this direction do not seem large.

We might lower the quality of our diet or resort to the use of land that is now submarginal to farm. I do not believe, however, that the first alternative would be acceptable or the second necessary.

Our best approach for making up the deficit appears to lie in obtaining better production on the land already in use.

Undoubtedly, if adequate quantities of equipment, fertilizer, and other production materials are available to farmers, and the price structure is favorable, a substantial increase in production can be achieved if all farmers were to use the most advanced practices known. Two estimates made recently suggested foreseeable needs in production might be achieved if full use were made of all currently available technical knowledge. Neither predicts that the goals will be realized in this way. The suggestions are based on assumptions we can scarcely afford to rely on. Nevertheless, there is opportunity to make substantial progress by obtaining more widespread application of what is now known.

The gains in the last 15 years have been spectacular. Aggregate output has been expanded and labor efficiency has been improved through a whole series of developments such as the introduction of hybrid corn and disease-resistant crop varieties; development of DDT and other insecti-

cides; the greater use of tractor power and fertilizers, and soil conservation practices.

A simple way to size up the gain and compare it with the size of the job ahead is to look at it on a year-to-year basis. Science and technology currently are giving us the equivalent of about five million acres of cropland a year. But that isn't enough. About three acres of cropland equivalent are needed to provide food and fiber for one person. If our present rate of population growth should continue we would need to add 7.5 million acres of cropland equivalent a year, or a 50 per cent increase over our present rate of gain.

This evidence appears to indicate we will have to rely on research, education and other programs that not only maintain high production, but increase it. Other considerations also should be taken into account.

Higher production must come without a proportional increase in costs. A reserve of productive capacity should be provided for contingencies.

How can it be done? In my opinion, it can best be done by building up a supply of technological findings upon which farmers can draw to meet the requirements as they arise.

New Knowledge Must Be Gained and Applied

A large backlog of improved practices and materials accumulated over many years was available to farmers when defense and war needs called for a rapid increase in farm production during the 1940's. However, the burst of development based upon such advances as the tractor and hybrid corn is about spent. The backlog of new developments today is comparatively smaller. The margin between the latest research results and their application on farms is narrowing.

Opportunities for acquiring new knowledge that will contribute to solutions of the problem of production are many. I would like to suggest only a few.

As research produces more effective methods of growing feeds, improves livestock and its management, and turns grasslands into more productive resources, supplies of food needed to maintain our diets will improve.

The problem of feeds currently plagues our national economy. There is a practical limit of about 90 million acres that can be devoted to production of corn, the principal feed grain. This is only slightly more than the 1952 acreage goals. The limit, while not a fixed one, is definitely related to the vital needs for properly balanced rotations of crops which must be carried on to protect and maintain our soils, and to competing demands for other products.

The situation holds true also for oats, barley and sorghum, the other principal feed grains.

Obviously, if feed grain acreage can expand only slightly, the alternative is to raise the average national yield per acre. It is estimated that this increase for corn must be at least 10 bushels by 1975. To do it, we must develop new and better yielding hybrids, not only for the low-yielding areas, but also for those now producing the high yields. This calls for much basic research. We must also develop through experimentation the proper combinations of good practices for areas that still lack them.

We will need to make better use of fertilizers. Farmers are investing more than one billion dollars a year for plant nutrients to achieve the present production. But we have yet to realize the full potentials of fertilizer use. Science must produce much more basic information on mineral nutrition. We need to learn, for example, how stepped-up applications of one plant food affect the balance of other plant foods.

We must build up our soils. Soil conservation and high acre yields go hand in hand. The more we improve our soils, the more we build up a reserve of production capacity. Much has been accomplished. Many soils have been improved. But on the whole, our soils are still going down hill. We must accelerate research that will help to check the declines now being experienced in the highly productive soils of the Midwest. We need to stop deterioration in the Great Plains, where soils already have lost between 30 and 40 per cent of nitrogenous organic matter.

Grasslands farming offers excellent potentials of checking soil deterioration and at the same time increasing livestock production. Research must develop grass mixtures and management methods that will permit Southeastern farms, for example, to take full advantage of all-year pasture opportunities. Management problems such as bloat must be solved.

Demand for Milk and Meat to Increase

It is estimated that 350 million pounds more meat must be produced each year just to keep up with the present rate of population increase. In addition to greater production of feed and forage crops, we must also find ways to make more effective utilization of the feeds. Animal nutrition presents a challenge that must be met.

Demand for milk products (except butter) is increasing. Even though production of milk per cow has been going up, the milk supply per person today is 110 pounds less than it was about 10 years ago. Without a substantial increase in the number of dairy cattle—which may not be possible because of labor shortages and the economic position of the dairying industry—the best way to meet our needs is to produce still more milk per cow. To maintain the present per capita milk supply in 1975, we must increase the average annual production per cow by 1,375 pounds. To have as much milk per person as we had 10 years ago, the increase must be 2,300 pounds.

Inheritance through breeding, disease control, and management are basic elements. The greatest opportunity, however, lies in the development of year-round feed supplies and better feeding practices. We must utilize pastures and harvested forages which can be made to yield large amounts of essential feed nutrients and do it at relatively low cost.

Most of the increase in milk production in the last 15 years may be attributed to an increase in grain feeding. The increase in the next 25 years in large measure must come from an increase in forage and pasture feeding.

It is almost axiomatic that we must develop better varieties of crop plants and eliminate insect and disease ravages if we are to improve quality and lower production costs. Better control of weeds and brush that decrease production also must be achieved. We have only begun here. Means must be found to reduce the present 10 per cent loss of all farm animals from disease and parasites. Brucellosis alone is cutting our milk supply by a billion pounds a year. And every gain in control of insects that will lop off some of the four billion dollar annual toll they take will be that much gain in our food supplies.

The more progress we make in solving problems such as these, the closer we come to overcoming the prospective deficit of 70 million cropland equivalent acres for 1975.

By stressing the opportunities for further gains in agricultural production, I do not mean to minimize the additional gains in our food supplies that can come from marketing and utilization improvements. It is not enough to produce. We must get fuller use for farm products.

Better storage and insect control practices which can be developed will help to save much of the half-billion dollars worth of grain damaged in storage each year.

The loss of 20 per cent of some fresh fruits and vegetables because of spoilage between farm and consumer can be reduced by better packaging, handling, transportation, and care in the retail channels. I am impressed by the opportunity when a responsible industry leader estimates that the "damaged goods rate" in well-run grocery stores is about 10 per cent. The post-war innovations in prepackaging and processing perishable products point the way we might go in meeting this problem.

We need to know how to avoid glutted markets in one place and scarcity in another. Marketing research in the last few years has given us many clues, and it can help us a great deal more in the future.

Research on better utilization of farm products opens other possibilities for a genuine increase in our total food supply. For example, 29 per cent of the solids not fat in the milk produced each year still is not used for food, despite greater use of dried non-fat solids in baking. Here is a

source of protein great enough to supply the daily requirements of millions of people.

Consumers waste much of the fat bought with meat. In effect, they are wasting valuable feed grains and forage that went into producing it. Through research we need to give farmers the aid needed to breed, feed, and market animals with less fat. There is a big job to do, too, in teaching consumers to demand and use food properly.

Conclusion

These are only a few of the areas in which we can contribute toward better agricultural production and use. Obviously, unless economic conditions change greatly, only a limited expansion is likely in land resources, but a ceiling on land productivity is not yet in sight. Since technology is a substitute production resource for land, it is vital that we extend the frontiers of production, utilization, and marketing knowledge and build up an adequate inventory of advanced practices to meet the probable demands of the future and provide a production reserve for contingencies. This calls for an enlarged research program directed toward the areas of greatest promise. But it is not a job for research workers alone. Those engaged in extension and teaching, legislators, and the public as a whole have a stake and a share of the responsibility.

PROSPECTS AND REQUIREMENTS FOR INCREASED OUTPUT¹

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THIS paper is largely a comparative discussion of available materials on prospective needs and potentials for increasing farm output. But I also hope to bring out some relatively neglected aspects on the production side of the problem.

Most of the recent appraisals rest on basic research and data collected and analyzed in the Department of Agriculture and the land-grant colleges and on the population projections of the Bureau of the Census. This is true of the report of the Water Resources Policy Commission and the more recent analysis of the Materials Policy Commission, as well as of the reports prepared directly by the Department of Agriculture and the land-grant colleges.² The conclusions reached in these studies differ in degree of optimism, especially with respect to our ability to supply future demands for farm products. Part of the difference results from variations in framework assumptions. Perhaps a part also can be attributed to inevitable bias. But surely most of the differences should be considered within the wide margin of error that is unavoidable in a forward projection of this kind.

Basic Assumptions

Any forward appraisal of agricultural prospects involves certain basic assumptions. First of all, the time period considered in this paper is the 1975 projection that has been used in most of the recent analyses. The most important assumption is one of progress toward peacetime conditions. If World War III should break out any time between now and 1975, the

¹ This paper expresses the writer's personal viewpoints on the problems considered, but he has drawn heavily on materials prepared by Glen T. Barton, Rex F. Daly, and Hugh H. Wooten.

² See (a) "A Water Policy for the American People," Vol. I, Chap. 11; (b) "Resources of Freedom," Vol. I, Chap. 9, and Vol. V, Reports Nos. 7 and 8, Materials Policy Commission; (c) "Agriculture Looks Ahead, A Study of Selected Trends and Factors Relating to the Long Range Prospects for American Agriculture," report prepared for the Committee on Agriculture, House of Representatives, 80th Congress, Second Session, 1948; (d) "Agriculture's Capacity to Produce—Possibilities Under Specified Conditions," prepared under the auspices of the Land-Grant College-Department of Agriculture Joint Committee on Agricultural Productive Capacity; (e) "Fertilizer Use and Crop Yields in the U. S." Report No. 5, Fertilizer Work Group, National Soil and Fertilizer Research Committee, Preliminary Draft, October, 1951; (f) Also unpublished materials prepared by Rex F. Daly, Glen T. Barton, and Hugh H. Wooten of BAE; (g) "The Population Upsurge in the United States," Food Research Institute, War-Peace Pamphlet No. 12, by Joseph S. Davis, deals with population prospects.

following appraisal would be seriously altered. A second major assumption is with respect to industrial activity and employment. High-level employment and high consumer purchasing power are assumed; also that inflationary tendencies can be controlled and prices fairly well stabilized, with farm cost-price relationships favorable to high-level farm production. In familiar terms, this would mean a parity ratio of about 100.

These are the general assumptions used in most of the recent appraisals. It seems unnecessary to state them more specifically for the purposes of this paper. It should be emphasized, however, that conclusions reached in this paper would not be valid in case we should encounter either deep depression or all-out war. If international arrangements were developed that would draw heavily on food and fiber supplies produced in this country, this also would constitute a major change in basic assumptions. The need for continuation of high-level defense for some time to come is recognized, but that is not inconsistent with gradual progress toward peacetime conditions over the longer time period. It is not assumed that economic stability will prevail throughout the period, but rather that there will be ups and downs of reasonable proportions, with high-level employment the prevailing pattern.

Prospective Requirements

The three major elements on the requirements side are (1) the level of population in this country, (2) per capita consumption of both food and non-food farm products, and (3) the level of exports and imports. On the question of population increases, the projections made by population experts is accepted. For this discussion I shall assume the medium population projection for 1975 of 190 million people.³ Variations from this projection would modify both the level of market demands and the need for production increases, but would not invalidate the general conclusions.

Food consumption per capita is, of course, closely related to consumer incomes. But can we be sure that recent historical relationships between disposable income and food consumption will prevail? Perhaps it is more reasonable to expect a declining income elasticity of per capita food consumption as real income increases. Schultz has pointed out that there are possibilities of technological improvement on the consumption side that might offset some of the effects of higher consumer incomes on food consumption.⁴ Waste prevention also could modify the relationship of per capita use to changes in income.

When it comes to non-food products, some people are very optimistic

³ This projection is accepted in the Water Policy Report and in recent BAE analyses. The Materials Policy Commission assumes 193 million by 1975.

⁴ Theodore W. Schultz, *Agriculture in an Unstable Economy*, Chap. III, p. 71.

about developing new industrial uses for farm products over a period of time. But new uses, if they appear, may be largely offset by substitution of synthetic products for natural fibers or oils, for example. Perhaps other farm products also may be displaced by non-farm products.

In his report for the Materials Policy Commission, Black estimates per capita food consumption by 1975 at 127 per cent of 1935-39 and non-food farm products at about 115 per cent.⁵ Daly recently has estimated per capita use of all farm products by 1975 at 117 per cent of 1935-39.⁶

The trend of exports and the export-import balance of agricultural products is perhaps the most difficult of all to project into the future. Within our assumption of gradual progress toward peace, however, we should expect gradual rehabilitation and production expansion in other countries. Because many of the less-developed countries have prospects for increasing agricultural production, perhaps it would be reasonable to expect somewhat lower demands on our food and fiber supplies than we have experienced in the recent period of war, rehabilitation, and defense. For this appraisal we shall, therefore, assume exports somewhat below recent levels. The most reasonable assumption concerning imports of farm products seems to be a gradual increase in volume to provide for the projected increase in population, to maintain per capita consumption of products not readily grown in this country, and to meet the demands of a gradually rising level of living. Within the limits stated, however, neither exports nor imports of farm products are large factors in the total requirements picture. Exports are likely to represent less than 10 per cent of the total output. Foreign markets probably will continue important for products such as cotton, tobacco, and wheat. But changes in exports and imports of farm products are likely to reduce the importance of net exports in our total requirements for farm products.

This statement of the prospective export-import balance will seem quite unsatisfactory to those who look at the present situation and future prospects with respect to world foods needs without considering purchasing power and the possibility of establishing arrangements for translating those needs into actual market opportunities.

I would readily grant that world conditions could change in such a way that there would be a substantial increase in total demands upon the farm plant. If this should occur, it would require an altogether different appraisal of our farm production capacity.

I fully recognize that this projection of requirements is made within a restricted framework. The future may develop a wholly different pattern of needs and prospects. The great uncertainty with respect to future developments emphasizes the need for considering *contingency reserves* to

⁵ *Op. cit.*, Vol. V, pp. 63-64.

⁶ Unpublished materials referred to in (f) of Footnote 2.

meet unforeseen emergencies.⁷ Production projections assume average weather and no unusual outbreaks of plant and livestock diseases. Protection is needed against weather and disease hazards, as well as unforeseen international emergencies. For the short term, this means reserves of storable products.⁸

A large livestock inventory might be partially liquidated in an emergency, partly to provide more direct food crops, and also to meet immediate needs for protein foods. But by far the largest part of our contingency reserve should lie in our capacity to expand farm production quickly in case of need. This implies adequate attention to soil conservation and improvement and to building other reserves of productive capacity that can be drawn upon in emergencies.

Summarizing the requirements, we might say that foreseeable demands for farm products by 1975 are likely to increase 30 to 40 per cent from 1950. This range of increase compares with a 30 to 35 per cent increase projected by Daly for 1975, and a 40 per cent increase projected by Black in the Materials Policy Commission report.⁹ The Water Resources Policy Commission report approaches requirements somewhat differently, but on the basis of some dietary improvement, the estimated increase comes out at 35-40 per cent above 1950.¹⁰ Although these studies differ in approaches and in details of analyses, the over-all conclusions are not far apart on prospective requirements.

Prospects for Achieving the Needed Output

Farm production can be expanded to meet the foreseeable demands for farm products. If research, education, and other programs are geared to facilitate needed increases, no major obstacles are likely to be encountered in producing for the requirements projected in this discussion. We are not approaching any physical limitations on production expansion. We have more land that can be utilized for crop production. At present, much of the land available for development would not yield a satisfactory return on the required investment. But some additional land will be used for crops by 1975. Wooten estimates that about 25 million additional acres

⁷ See writer's paper, "Farming Systems in Relation to Soil Conservation," Proceedings of the United Nations Scientific Conference on the Conservation and Utilization of Resources, 1949, Vol. VI, pp. 79-85.

⁸ See "Reserve Levels for Storable Farm Products," Senate Document No. 130, 82nd Congress, 2nd Session.

⁹ The estimate as given in the report is 40 per cent (Vol. V, p. 64), but it seems to work out somewhat higher if computed from actual utilization in 1950 because of an upward adjustment in 1950 per capita food consumption. The population estimate is also three million higher than the 190 million used by Daly and assumed for this discussion.

¹⁰ *Op. cit.*, pp. 156-158.

might be used for crops by that time.¹¹ This might actually involve 35 to 40 million acres more of new land development because of continued encroachment on cropland of special uses such as roads, airports, reservoirs, and urban areas. A large part of the development, however, would be within the boundaries of present farms.

Much more important than expansion of cropland will be the increases in production per acre and per animal. Higher crop yields result partly from improvement of the land now in crops and pasture, but they involve much more than that. They are essentially a substitution of other resources for land. The greatly expanded use of fertilizer, machinery, pesticides, improved crop varieties and other technological changes have resulted in extensive substitution of resources in farm production. The change can be characterized as a substitution largely of non-farm resources for both land and labor in the sense that output has been increased without much increase in cropland, and with actual decreases in inputs of labor. For example, in 1951 farmers in this country produced nearly 40 per cent more output than the average of pre-war years 1935-39. To do that they used about the same acreage of cropland and 14 per cent fewer hours of labor; but their machinery inputs had nearly tripled, and they used 230 per cent more commercial fertilizer.

This resource substitution in agriculture has profound implications for the future. How far can it go? What are the effective limits? Certainly with our present "know-how" and with further developments of new technology that still are seen only dimly on the horizon, land in this country is not the limiting factor conceived by Ricardo, or even by the neo-classical economists writing in the early part of this century.

With no technological improvement, output could be expanded only by bringing in additional land or by more intensive cultivation; that is, applying more labor and capital inputs to a given quantity of land. This usually results in greater input per unit of output, and therefore increased cost.

The resource substitution made possible by research and discovery provides two additional ways of increasing output. Substitution of mechanical power for animal power releases cropland previously utilized for horse and mule feed for production of other products. This additional way of increasing output for human use was tremendously important from 1920 to 1950, when about 70 million acres were shifted, but it will have much less effect on output in the future. It is possible, however, that by 1975 from 10 to 15 million additional acres could be released in this way for production of other crops.

Adoption of various types of improved practices that result in higher

¹¹ Unpublished materials cited in Footnote 2.

output per acre with less than proportional increases in inputs is by far the most important factor in increasing productive capacity. For example, agronomists have estimated that corn yields in the South could be tripled by heavier fertilization, use of adapted hybrids, close spacing and optimum levels of other good-management practices.

Incidentally, such potentials for increasing the yield per acre indicate that acreage allotments are not likely to be effective in restricting production in case surplus situations should develop in some of our cash crops.¹² Other resources, including fertilizer, would be substituted for land. And production per acre would increase to offset acreage reduction, at least in humid and irrigated areas. Substitution of other resources for land is likely to be more difficult in sub-humid areas. And, of course, some time usually is required for farmers to make the substitution effective. But our experience with acreage allotment programs in the late 1930's indicated that within four to five years yields are likely to increase enough to offset a fairly large reduction in acreage.

Some measure of the extent of the resource substitution that has taken place is possible from available data. For example, in 1940 farm labor (including both family and hired) constituted about 40 per cent of the total inputs in farm production.¹³ Farm machinery, fertilizer and lime accounted for only about 20 per cent. In 1950, farm labor made up slightly more than one-fourth of total inputs, but by that time farm machinery, fertilizer and lime exceeded the labor inputs, and accounted for more than one-third of the total.

Total production inputs were one-fourth higher in 1950 than in 1940, largely because machinery inputs more than doubled at the same time that labor inputs decreased 14 per cent. To some extent perhaps, farmers have built up a reserve of farm machinery in recent years. But despite heavy machinery purchases since 1945 (which are reflected in current inputs), the rise in total inputs has not exceeded the rise in output. Both input and output rose by one-fourth from 1940 to 1950. If instead of single years, we compare the average of the three years 1939-41 with the last three years, 1949-51, we also get a 25-per cent increase in both inputs and outputs.

If we compare changes in inputs and outputs over a longer period, the result is quite different from the 1940's. The years 1919-21 might be taken as the beginning of mechanical power farming and associated improvements. If we compare the average of those years with 1949-51, we find a 60-per cent increase in total output accompanied by about a 25-per cent

¹² It would not be surprising to see a return of surplus conditions for some cash crops as we struggle with transition adjustments, but over a period of years, markets should be available for a balanced output of farm products.

¹³ Inputs are measured in terms of 1935-39 average dollars. They should reflect the physical changes that have taken place rather than the price variations.

increase in total inputs. In other words, improved technology and resource substitution have resulted in a net gain in efficiency when measured over the time span of 30 years. Inputs per unit of output decreased about one-fourth from 1919-21 to 1949-51. They decreased about five per cent from the pre-war years 1935-39 to 1951, despite the high machinery input in the latter year.

Resource substitution, however, has changed the farm cost structure. Cash inputs are now a much larger proportion of the total. They averaged 40 per cent of total inputs in the years 1919-21 and more than 50 per cent in 1949-51. In the 1940-50 decade, cash inputs increased by one-half as compared with an increase of one-fourth in total inputs.

The higher proportion of cash inputs has important implications from the standpoint of operations in years of unfavorable price or production conditions. The "break-even points" in farming are much higher than in the old days of horsepower and hand-labor operations. Rent and interest payments are not included as cash inputs in the above computation. Farmers who rent land for cash or have to meet interest and amortization on debts will find these charges remaining relatively fixed despite reduced incomes. Cash outlays for family living also are higher than in former years. Farmers will tend to borrow more money in unfavorable years to meet their fixed charges. This will increase current obligations and tend to offset any reductions of other cash expenses in unfavorable periods.

Changed Pattern of Farm Investment

There also has been considerable change in the pattern of farm investment with real estate assuming a relatively less important role. For example, in 1940 real estate constituted 76 per cent of physical assets on American farms, and livestock, machinery, and other supplies 24 per cent. In 1952 real estate accounts for only 68 per cent of physical assets, with machinery, livestock and other supplies rising to 32 per cent of the total investment.

Although the available evidence seems to indicate that the resource substitution made possible by research and discovery has resulted in more efficient use of farm resources, we cannot take the gross gains in farm output or output per worker, per acre and per animal and consider them as measuring gains in resource efficiency. There are many off-setting factors. From the standpoint of society, however, food, fiber, and other products are being produced today with a smaller input of resources per unit of output than before World War II and with a much smaller input than at the end of World War I. Furthermore, it seems safe to conclude that with the improved techniques that are now known and fairly well tested, and certainly with the further improvements that seem to be on the hori-

zon, farm output can be expanded by 1975 to meet foreseeable demands at 30 to 40 per cent above present levels.

The recent Land-Grant College-Department of Agriculture cooperative study of productive capacity indicated that under forced draft conditions, we could increase farm output 20 per cent within a period of about five years.¹⁴ The theoretical limits of output indicated by the estimates of maximum yields reported in that study were of the magnitude of about 60 per cent, but not within a five-year time period.¹⁵ Barton estimates a 35-per cent increase in total farm output by 1975, assuming continued development and adoption of improved practices, about 25 million acres additional cropland, and considerable improvement in permanent pasture.¹⁶ In the Materials Policy Commission report, Black estimates a 33-per cent increase by 1975 without allowing for additional cropland. But he also gives a theoretical maximum of 86 per cent based on full adoption of known improvements.¹⁷

It should be recognized that the latter estimate, and the 60 per cent increase developed in the productive capacity study, are not fully realizable even under the most favorable conditions. For example, they would involve complete adoption of all known improved practices in all farm production. Even if the price-cost and credit structures were such that this would be profitable, limitations of knowledge, managerial skills and capacities, along with other factors would limit attainments.

The Water Resources Policy Commission is much less optimistic with respect to production potentials. They state: ". . . it appears that the increased productivity of existing agricultural acreage, if added to the production available from new lands brought in by irrigation, drainage, flood control, and clearing, is likely to meet the Nation's expanding requirements over the next 25 years by a rather narrow margin."¹⁸ The Commission's estimate of "requirements" include considerable improvement in dietary levels, which means that needs could be met more easily at lower diet levels. But if the margin is that narrow for the next quarter century, the food supply prospect for the more distant future is indeed a bleak one.

The preponderance of evidence, however, points to expansion of farm production in line with foreseeable demands over the next quarter century. It also appears probable that the needed increases can be achieved without encountering higher costs per unit of output, assuming continued technological improvement and their adoption by farmers, greatly expanded research, educational, and other public aid programs.

¹⁴ *Op. cit.*, p. 6, Table III.

¹⁵ *Ibid.*, pp. 59-61.

¹⁶ See reference in Footnote 2.

¹⁷ *Op. cit.*, Vol. V, pp. 65-66, tables V and VI.

¹⁸ *Op. cit.*, Vol. I, p. 164.

Achievement of Potentials

We need to consider the factors limiting expansion of output in line with market demands, and plan ahead to remove the chief obstacles. We also need to develop contingency reserves of productive capacity that can be drawn upon in case of unforeseen emergencies.

What are the effective brakes on increases in output? At any one time, the price-cost relationship is likely to set definite limits. The price system is expected to perform the role of balancing production with market opportunities, but frequently prevailing prices and costs are not a reliable guide to future prospects. Income incentives are necessary for additional investments that result in future expansion, and also for annual maintenance of the higher level. For example, recent studies indicate an investment cost of about \$70 per acre to establish improved pastures in the Southern Piedmont. And the annual maintenance cost for lime and fertilizer alone runs from \$15 to \$20 per acre. Higher investment and higher operating costs increase risk of losses from price instability, crop failure, and livestock losses. We all recognize that time is required for adjustments in farming and that this also involves the risk of price and production changes. Improvements that require considerable investment and some time to carry out, therefore, need to have a fairly high earnings prospect.

Public measures to protect farmers against price and production hazards are likely to reduce considerably the price or income incentive necessary for output expansion. Therefore, income support programs, crop insurance and other protection against hazards beyond the control of individual farmers need to be accorded a definite place in our agricultural programs.

Many farmers are not able to obtain the capital needed for additional investments of machinery, pasture improvement, and other changes, even when such investments would prove profitable. Therefore, financial means and credit availability are necessary for output expansion. Also, farmers must have adequate information concerning the probable costs, returns and profitableness to them of improvements that increase output. And the new ways of farming require greater managerial ability and skill in production than the older techniques. Losses are greater if operations are not carried out effectively.

With the greatly expanded use of non-farm resources, it goes without saying that these must be available if production is to be increased. Fortunately most of them can be expected to be in adequate supply under peacetime conditions, but we need to raise the question whether over a longer period of time we are likely to encounter scarcity costs of such supplies as motor fuel and potash fertilizer. The recent Materials Policy Commission Report is a good beginning for an examination of this problem.

It is quite evident that research, education, and other programs become

essential to maintaining high-level production and achieving further increases. They are a strategic part of our total farm inputs.¹⁹ They should be so recognized. And research is needed on how to use these inputs most effectively. Research has made possible the tremendous increase in output that has already been achieved. Educational programs have brought research results to the attention of farmers. And credit, price support, soil conservation, and other programs have facilitated adoption of production-increasing improvements.

Research is the key element in this chain reaction. But this group is well aware that we cannot expect immediate results from new research programs. Research must precede the actual need for higher output and time must be allowed for research to bear fruit. This is illustrated by the fact that crop production per acre showed little change prior to World War II. Since that time, a combination of factors have made it possible to reap the rewards of both the early and current research efforts.

More Research Effort Needed

More research effort is needed to increase output from a high level than a lower level because part of it has to go into maintenance of the output already attained. For example, research funds have to be expended just to maintain the improved crop varieties and for disease control and prevention. Consequently, the general public needs to recognize that research inputs will have to become more and more important in our agricultural economy. We shall need to depend upon research to increase production without proportional increases in costs. If production expansion has to be attained at higher unit costs, our national production efficiency will be lowered. Research will be needed to develop new production-increasing opportunities, to appraise alternative ways of expanding production as needed, to point out the most efficient ways, the most profitable adjustments for farmers, and how these might be achieved.

Fortunately there seems to be considerable opportunity to achieve increased output at even lower costs per unit in many sectors of agriculture. For example, the 1950 census classified 708,000 farms as *small-scale*. That is, they had gross farm sales of only \$250-\$1,199 in 1949, with the operator working off the farm less than 100 days, and farm sales exceeding the family income from other sources. Also listed were 896,000 small commercial family farms that had gross farm sales of \$1,200-\$2,499 in 1949.

Effective assistance should be developed for these two groups of low-production farms—either to increase output on farms, or to find better opportunities outside of agriculture. Because labor is now used very ineffectively on most of these farms, increasing output per acre and per

¹⁹ These inputs are not included in current series, and usually they are not thought of as "farm costs" because they are not a direct outlay by farmers.

animal (and perhaps also through farm enlargement) would greatly increase output per unit of input. Farm families should have the information needed to select their highest income opportunities. If their best opportunities were to be found in agriculture, a program of assistance in farm planning, and credit geared to increased income expectancy, would furnish effective aid in achieving higher incomes and greater efficiency. Effective economic research is needed to appraise adjustment opportunities, to provide input-output information for farm planning, and to outline suitable credit arrangements.

Possibilities for increasing output on low production farms has a bearing on the limit to substitution of other resources for land and labor. Barton estimates that by 1975, total man-hour inputs in agriculture could be reduced 10 per cent below 1950 even with a rise of 35 per cent in output.²⁰ This would result in about a 50-per cent increase in man-hour productivity. Such a decline in labor input should be readily attainable with a fairly complete mechanization of the cotton crop and some progress in mechanization of tobacco, carried out in conjunction with farm consolidation, farm enlargement, and increased production per acre and per animal in the low-production farm areas.

Greatly increased use of fertilizer, pesticides, improved crop varieties, better feeding and care of livestock, crop rotations, conservation practices, and pasture improvement are some of the practices that will result in higher production per acre and per animal, and in increased production at lower costs. But economic research is needed to determine the most profitable combination of these improvements in a given situation. Also because improved practices are adopted rather slowly, and not all farmers are in a position to take advantage of them, we need to depend upon an ever-increasing flow of new cost-reducing techniques. Within the time span of nearly a quarter century, it seems likely that new improvements, including some that are not even thought of at the present time, will be introduced and perhaps adopted fairly generally by farmers. For example, we are not yet in a position to appraise effectively the potentialities of Krilium and other soil conditioners.

Of one thing we can be certain, however: such improvements will not appear spontaneously. We shall have to search for them if we are to enjoy their benefits. We then need to test them out to appraise their potential effects and to determine whether it will pay farmers to adopt them.

Conclusion

In conclusion, I should like to emphasize that research, and other programs as well, should not be thought of merely in terms of their contribution to increased production or even production efficiency. Efficient pro-

²⁰ See Footnote 2.

duction in line with market opportunities is a part of agriculture's responsibility, but it can be accomplished in different ways. And research can be utilized not only to increase efficiency, but to help us achieve the kind of an agriculture we would like to have.

It is both possible and desirable to institute research to achieve the goals of agriculture. We need to ask and find answers to questions such as the following: If owner-operatorship of family farms is a desirable goal, how can we facilitate its attainment? Do we have to have migratory labor in agriculture, or could research programs be instituted that eventually would eliminate nearly all stoop labor? What can we do to get more widespread benefits from technological improvements—to small farms as well as to big farms, to hired workers as well as to farm operators? Can we work out ways of improving managerial ability and skill to utilize the new ways of farming more effectively, and to increase incomes for those who find their best economic opportunity in farming? Can we develop aptitude testing and other aids in helping young farm people find their best vocational choices, either on or off the farms?

We also have some questions to answer that involve reconciliation of individual, group, and public interests. For example, is it possible to develop techniques for working with farmers on achieving balanced farming programs on their farms that will also result in balanced production, area by area and for the nation as a whole? This would involve a program of farm planning assistance that, if carried out on a voluntary basis, would add up to balanced total production in view of market opportunities. Farm programs also would need to be geared toward making adjustments in the direction of balanced total production as the most profitable alternative for farmers.

Provision for adequate reserve capacity again involves reconciling private and public interests. Building up a *contingency reserve* of production capacity that can be drawn upon in case of emergency is not likely to be rewarded in the market place. Public aid will be needed to create reserves, and to guard against depletion. Meeting market demands that can be foreseen has first priority even from the public point of view. But in the present state of world uncertainty, attention also should be given to reserve capacity. An important part of our reserve capacity would consist of maintaining soil resources in a condition that would permit much heavier cropping in emergencies. But since non-farm resources are an ever-increasing part of total inputs, we also need to consider reserve fertilizer capacity, adequate inventories of power and machinery, and we must guard against unexpected shortages of key supplies such as motor fuel.

Any steps taken to build up reserve capacity should be integrated with other agricultural programs. For example, if a crop surplus is encountered, perhaps the best way to deal with it would be a soil improvement program

to build up a productivity reserve. Greater emphasis on grasslands and livestock farming will provide added flexibility in production to meet rapid changes in demand.

Fortunately we do have great flexibility in the use of our farm plant. And the recent study of productive capacity indicated the possibility of rapid increases in production under forced draft conditions. But that capacity consists largely of a backlog of improved practices. This implies the need for a reserve in research "know-how," facilities, and even in results—that is, development of production-increasing improvements that can be adopted under pressure. And research will be needed on how to achieve and maintain reserve productive capacity most effectively, and at the lowest cost.

Our greatest reserve is the health and intelligence of farm people. Constant improvement in health, education, and living conditions on the farm will yield immeasurable benefits under any conditions. But we know from our experience in World War II that farm people who know how to marshal the resources under their control can accomplish near miracles, once they are convinced of urgent need.

DISCUSSION

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To comment on a pair of papers as brilliant as those of Shaw and Johnson is quite difficult because of their wide scope and wealth of ideas. Both are addressed to a topic which is one of the most timely and most challenging topics of our day. Each has much to contribute although some points might have been more fully elaborated upon.

These comments fall naturally into three parts: first, some preliminary remarks upon some similarities and some differences in the approach taken in the respective papers; secondly, some observations with respect to a series of points raised in the two papers; and third, a brief discussion of some aspects that might have been more fully emphasized.

Similarities and Differences

Both papers have much in common although they represent two different approaches to a similar topic. Each paper recognizes that there is no foreseeable absolute limit to which the capacity of American agriculture might ultimately be lifted. Rather, capacity must be thought of in a relative sense, relative to present capacity and more particularly relative to the needs of the American economy at some given date. A quarter of a century hence, 1975, was selected as the target date by both gentlemen.

Both men agree that until about 1920 the food and fiber needs of the growing nation had been met by an agricultural growth in an extensive sense, by cultivating additional land. Since that date frontiers have been of an intensive nature. Future growth must largely come in the same manner except

for some 15 million additional acres that can be released from production of horse feed to the production of food and fiber for human consumption and an additional amount of some 35 million acres that can be added to our total by drainage, land clearing and irrigation. Both men agree that future needs must largely be met through increased yields. Both visualize a major role for research and technology. Both admit important roles for educational and service programs which, however, they do not emphasize to the degree that they emphasize research which Johnson refers to as the key element in a chain reaction.

But the approach then taken by each was significantly different. That by Dr. Shaw was admittedly a physical approach, that by Dr. Johnson largely economic. Dr. Shaw stated that his objective was to appraise the adequacy of America's land resources to meet future needs in order to point the way to additional research needed in the physical sciences in the next quarter century.

On the other hand, Johnson's approach was largely economic. He stated his purpose to be largely that of a comparative discussion of available materials on the question of analysis of future food and fiber needs and of our capacity to meet them, and to bring out some relatively neglected aspects on the production side of the problem which was emphasized relatively more than the consumption side. To meet future needs he appealed for more economic research.

The difference in approach may be best illustrated in the way that each developed and discussed future needs.

Dr. Shaw developed the idea of a cropland equivalent as a yardstick by which to measure future needs of a growing population. He converted pasture land into cropland equivalent, adding to the total, new lands that can be developed from clearing, draining and irrigation and additional land to be released from horse feed production. Then, assuming a need of three acres per person, which he takes as his divisor, he foresees a gap in the next quarter century which can be filled only by increasing the productivity per crop acre or per animal.

Some economists might be unhappy about his great emphasis on land as a resource, which Johnson points out was the emphasis of classicists and neo-classicists, and his relative neglect of consumption aspects in developing his yardstick of future needs. His was by no means an economic analysis. Lest any economists be led to criticize this as a shortcoming may I say that his paper and his concepts are in language that agronomists, soil conservationists and other production minded people can readily understand, which is more than can always be said for the language of the economists.

Yet there is much that can be said for Johnson's approach. He realistically recognizes the great role of consumers especially in an economy where non-farm people outnumber farm people by 8 or 9 to 1. He takes consumption needs and a consumption-production balance in 1975 as his yardstick, which leads him to foresee a needed output increase by 1975 of 30 to 40 per cent from 1950, a quite modest percentage when compared with the increase during the decade of the 1940's. But he leaves war out as an influence as well as inflation, price and income instability and deep depression, and assumes full employment and a parity ratio of 100 as the prevailing pattern.

Johnson is highly optimistic about our ability to meet future needs which can be summarized succinctly as "can do." His optimism is based on an input-output analysis and a high degree of "resource substitution" despite certain

brakes which he discusses at some length. He emphasizes the importance of incentives.

So there are great similarities but significant differences in the approach of the two papers.

Some Significant Points

One significant point has to do with the topic being discussed which is highly significant in the context of the times. We are now in an era of full and abundant production. This has not always been true. Nor is it likely to continue for all time.

The interwar period was generally an age of so called surpluses. Such an age may recur when and if the defense period comes to an end, indeed when defense expenditures with their bolstering affect on consumers' incomes taper off. At such a time a deficit productive capacity may turn into excess productive capacity, for there is only a one way upward road in the elasticity of supply of farm output. This point was inadequately covered in both papers.

In coping with such conditions, if they recur, there are implications for public policy in the great increase in per acre yields both past and potential. Johnson points out in this connection that acreage quotas and allotments are relatively ineffective in controlling production in times of so-called surplus conditions for some crops because of a stimulus to increased yields and intimates that some different approach for meeting such problems is clearly called for.

Both papers are in long range terms largely concerned with stimulating the growth of our agricultural capacity to meet long range needs. But they neglect the more short term problem of dealing with cyclical fluctuations.

Another important point relatively neglected in both papers, especially that of Shaw, is the export-import problem. Johnson does assume exports of up to 10 per cent of our agricultural output. Shaw is concerned entirely with domestic output. However, this nation in its new role of international leadership is groping for effective ways of wearing its new mantle. Agricultural isolationism is just as untenable as military or political or social isolationism. In any appraisal of future needs and of productive capacity to meet such needs, international aspects cannot be glibly overlooked.

One of the most intriguing points is that made by Johnson under the heading of resource substitution. He was in effect saying that by traditional theory there are two general ways of increasing output, (1) by adding more land or (2) by adding more capital to a given land. But the additional successive inputs result in a declining increment of output and hence are at increasing cost. By some fortuitous substitution and combination of resources additional inputs may result in an increasing increment of output and hence at declining costs. Thus, he very properly called for more research concerning the most profitable combination. It must not be inferred that Johnson was challenging the traditional concept of the production function and inferring that agriculture was an industry of declining costs. For although some economies of scale are possible in agriculture, there are also great limitations due to the element of space and those of management.

Points Especially Inadequately Treated

There was an inference in both papers that future needs can be met largely by new research. Shaw called for more research in the physical sciences, Johnson appealed for more economic research.

Although both may be needed they will not *per se* insure the additional output called for by both men.

In the first place, there is already a considerable body of knowledge not sufficiently applied. If all farmers were operating up to the level of the most efficient or the most productive or up to the level which they already know how to attain, much of the needed additional output could be achieved.

Furthermore, a mere backlog or storehouse of information on which farmers can draw will not insure that they will draw upon it.

Some motivation, some stimulation, some education and application are called for too. The files of the U. S. Patent office are clogged with blueprints and models of unapplied and unexploited ideas in the form of inventions. A splendid storehouse of moral knowledge is contained in the Bible but who can deny that after 2,000 years of the Christian era, churches, Sunday schools and moral education are not still badly needed?

There can be no one shot method, namely research, in obtaining expanded farm output to meet future needs. A well rounded program including both research and its application in the form of intensive Extension and service programs is clearly called for. There exists much human inertia and resistance to change and a smug adherence to the status quo. These must be relentlessly attacked if there is to be progress.

But generally both were masterful papers. They were refreshing too in their note of optimism for the future. They not only contribute much to our thinking but they also give an emotional uplift at a time when the world is imbued with fear that needs to be dispelled and replaced with hope and confidence. To this end there is a hopeful note in both papers.

STABILIZING SUPPLIES AND PRICES

Chairman: R. L. Kohls, Purdue University

DIRECT PRICE CONTROL IN FOOD AND AGRICULTURE

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THIS paper engages the following questions: What are the legal standards governing direct price control? What administrative standards were formulated to implement them? What were the objectives of the stabilization agencies? How were the programs adjusted to a changing statute and economy? What special standards, programs, and policies were developed in food and agriculture? There is some discussion of the apparent impact of the food and agriculture programs upon production, distribution, and price; and a brief analysis of price control policy in a cold-war economy.

Statutory Standards for Price Control

The 1950 Standards.—The original statute set out broad policy goals and pricing standards to be implemented operationally through executive orders, delegations of authority, administrative policy declarations, operating instructions, statements of considerations, and the regulatory actions themselves. At the same time, the Congress specified a detailed series of requirements and restrictions with respect to the rights of individuals affected by the regulations.

Additional 1950 Standards for Agriculture.—A series of additional standards applied only to agricultural products. No ceiling price on an agricultural commodity could be maintained below the highest of: (1) the effective parity price; (2) the highest price in the month prior to the Korean outbreak; (3) the average price in some other representative period determined by the Secretary of Agriculture, and as with the two preceding legal minimum prices, adjusted by him for grade, seasonal, and location differentials; (4) special minimum prices for certain tobaccos. Ceilings for products processed from agricultural commodities had to be high enough to reflect actual prices paid to producers up to the legal minimum level plus an adequate rate of earnings to processors. Ceiling prices had to be increased to adjust for any agricultural disaster involving substantial decreases in merchantable crop yields or unusual increases in costs. No price control regulation could supersede a price authorized under the Agricultural Marketing Agreement Act of 1937. The Secretary of Agricul-

¹ These views are the author's and do not necessarily reflect official OPS policy.

ture was given effective power to determine legal minimum prices for fluid milk at the producer level in all areas. Livestock and meat registration, entry control, and distribution control programs were operated until 1951 under broad statutory authority delegated by the President to the Secretary of Agriculture and from him through the stabilization hierarchy to the Office of Price Stabilization.

The 1951 Standards.—In June of 1951, the Congress extended the statute for one month with an anti-rollback provision which stalemated issuance of new regulations. At the end of July, 1951, the act was amended with three new anti-rollback provisions. The administration program was rejected.² There were two major additions to the general pricing standards. The Capehart amendment prohibited imposition of ceilings on non-agricultural commodities below the lower of the prices prevailing when the order was issued or in February, 1951, unless the ceiling price were at least as high as the highest price prevailing in the months January-June, 1950, adjusted for subsequent changes in all costs to the cutoff date of July 26, 1951. Further, any processor could demand adjustment of his individual ceiling price on a similar basis. The Herlong amendment provided that in orders issued after its enactment, groups of distributors be allowed the same percentage markups customarily applied by them to acquisition costs prior to the Korean War.

Additional 1951 Standards for Agriculture.—The 1951 amendments added three new protective standards for agricultural commodities. The Fugate amendment, designed mainly to revoke beef rollbacks but actually affecting many other commodities, provided that "No ceiling shall be established . . . for any agricultural commodity below 90 per centum of the price received (by grade) by producers on May 19, 1951, as determined by the Secretary of Agriculture." Second, support prices promulgated under the Agricultural Act of 1949 were also declared to supersede any price control regulations. Finally, the Secretary of Agriculture could thereafter veto ceiling prices to producers for milk used for manufacturing purposes. Authority to register slaughterers and to control new entry was retained but power to allocate periodic slaughter quotas was eliminated. Import controls were imposed upon several agricultural products.

The 1952 Standards.—The Congress recommended suspension or de-control of all commodities and services as rapidly as possible. Reporting

² The program proposed a two-year extension of the act; authority for differential subsidies; stronger antihoarding provisions; recognition of parity payments in making "disaster" adjustments; new price standards of fluid milk in nonfederal order areas; a one-year freeze of legal minimum prices at levels prevailing at the beginning of the marketing seasons; stronger control over nonregulated public utilities; clearer enforcement powers; limitations on commodity exchange margins and practices; authority to license business enterprises and to revoke licenses for violations.

requirements were greatly eased. The Herlong guaranteed markup provision became applicable to all regulations regardless of issuance date and applied pre-Korean customary dollar-and-cent markups as well as customary percentage markups. No ceiling price could be imposed at levels lower than those specified in effective and enforced state minimum markup laws, other than fair trade laws.

Additional 1952 Standards for Agriculture.—Processors of farm products were declared to be covered by the Capehart anti-rollback amendment of 1951 and distributors of such commodities were given the privileges of the Herlong amendment—for fluid milk, on an area basis. For all practical purposes, milk prices set by state boards became the legal ceiling prices. Fruits and vegetables were exempted. Legal minimum price provisions were amended to conform to the extension of the dual parity system and the elimination of sliding supports for basics in the Agricultural Act of 1949. All fertilizer sellers were given the benefit of retail markups. Affiliated distributors of meat were generally guaranteed the same allowances as unaffiliated distributors. The Williams amendment required that wherever ceilings were imposed upon producer prices, legal minimum margins, but no higher, be allowed to processors and distributors. No restrictions could be placed upon species, type, or grade of livestock killed nor upon type of slaughter operation. No meat or meat product could be allocated unless the Secretary of Agriculture certified the over-all supply to be short of civilian and military needs. There was nominal relaxation of the import quotas on farm products.

Summary.—The pricing standards of the 1950 act were much like those of mid-World War II: general standards applied to the general economy. Agriculture was given parity, disaster, and support program protection in addition. In 1951, general problems—such as rollbacks—and individual cases of uncomfortable ceilings, were handled through specific statutory standards. Farmers were given special anti-rollback provisions and further exemption from milk price control. By 1952, it was the declared policy of the Congress to eliminate price controls as rapidly as possible. Farmers again received more than the usual special adjustment.

Operating Standards

The general statutory standards were implemented by formal administrative instructions to assure conformity to the declared policy of the law, to prevent arbitrary and capricious action; to maintain uniformity and efficiency of internal operation; and to assure stable public and Congressional relationships. It was, of course, necessary to adjust such instructions to changes in the statute.

General Rules.—On December 19, 1950, the Economic Stabilization Administration announced that all prices except those of raw agricultural

commodities were subject to review and possible rollback under published standards. In addition, formal standards for voluntary industry price control agreements were issued.

When the general freeze was imposed on January 26, 1951, operating instructions encompassed the following criteria: limitation of escalation and pass through of costs; use of June, 1950, selling prices plus direct cost adjustments for regulations; use of wartime regulations where feasible; minimal administrative burdens; careful appraisal of practicability and enforceability; avoidance of regulations based on historical gross margins; prevention of unnecessary breaching of existing contracts. The general objective was to maintain freeze-period general price levels and to restore normal price differentials.

Shortly thereafter, general operating standards were issued to extend a tailored system; to supplant the freeze with interim formula regulations covering many industries and providing for self-calculation of ceilings; to move towards individual tailored regulations with uniform dollar prices and public posting; and to reduce ceiling prices wherever permitted by law and by production goals; to increase ceilings only where industry returns were below specified levels or where an increase was necessary to obtain essential supply.³ The general techniques recommended for use included: (1) a straight freeze on a recent base period; (2) a modified freeze with ceilings adjusted to reflect recent costs; (3) a formula technique setting ceilings on the basis of markup over costs. The general goal was "to keep from increasing prices and to reduce them wherever possible." The basic policy of cost absorption—that cost increases should be reflected as increases in ceilings only to maintain specified levels of industry earnings—was set out clearly. If the prevailing ceiling for any important product made rollforwards necessary in other ceilings in order to maintain normal differentials, the prevailing ceiling was to be rolled back where feasible in order to avoid the rollforwards. For any industry, the weighted average GCPR price was the target level.

Adjustment Standards.— Except for ceiling on raw agricultural commodities, which were protected by statute, the *earnings standard* provided that: "The level of price ceilings for an industry shall normally be considered 'generally fair and equitable' under the Defense Production Act if the dollar profits of the industry amount to 85 per cent of the

³ A tailored regulation—the ultimate objective of the program for all commodities—applied to a more narrow range of products than the freeze or an interim order; conformed more closely to historical pricing methods and differentials in the industry; minimized price inequities among sellers; recognized trade practices where consistent with enforcement; controlled evasive practices; involved minimal reporting and record-keeping consistent with enforcement; and provided effective procedures for pricing new goods and sellers.

average for the industry's best three years during the period 1946-1949, inclusive. The profits should be figured before federal income and excess profits taxes and after normal depreciation only, with adjustments made for any change in net worth." This industry-wide standard was used mainly to appraise industry-wide appeals for higher ceiling prices or margins. Where necessary, the operating instructions authorized use of some measure other than dollar profits, a percentage of average earnings other than 85, a different base period or a specific battery of products. The standard was also generally used to assure that proposed ceiling price levels were fair and equitable.

The *product standard* required that: "The total revenues currently received from the sale of a product line (at ceiling prices) must cover the aggregate of current operating costs attributable to the production and distribution of that product line, including a properly allocable share of the general expenses of the companies producing it."

A general over-riding regulation authorized *individual adjustments* of ceilings as necessary to obtain a break-even operation for the individual firm, but only where the ceiling price alone was clearly responsible for the loss position. In addition, most regulations contained adjustment provisions to mitigate individual inequities or dislocations. Ceiling prices for *essential industries* also could be increased above freeze period levels in the event that an increase in supply of the commodity was required for defense needs and the price increase was necessary to obtain the expansion of output. The statute clearly contemplated *exemption* of minor items insignificant to costs of living or defense, presenting administrative burdens to sellers or OPS, and in which decontrol would not involve advantage over sellers or related commodities. A broad-scale program of decontrol of such items was developed in all commodity areas under several over-riding regulations. Operating divisions were instructed to avail themselves of whichever phase of the Capehart amendment would result in the lowest prices and yet meet the fair and equitable standard. Short-cut procedures were provided through general over-riding regulations to implement individual applications for adjustment of ceiling prices by sellers. Distributors under the Herlong amendment were required to assume the burden of demonstrating that as an industry they customarily applied a specific percentage markup to acquisition costs on specified groups of commodities. After the 1952 amendments, the agency was required to review all distributive regulations involving percentage markups.

Operating divisions were instructed to *roll back* prices where increases had been speculative and clearly exceeded increases in comparable industries. Ceilings could be rolled back only within the earnings standard and to a level restoring normal differentials, assuring adequate production and avoiding the necessity to increase the ceilings of related commodities.

The agency did not follow price declines in depressed markets. In general, four conditions were required for *suspension of control*: prices in the entire area were materially below average ceiling levels; there was no foreseeable necessity to reimpose ceilings; an adequate price-watching mechanism could be established; and a trigger device could be formulated to assure that ceilings could be reimposed prior to general breaching by rising market prices.

Except* where the legal minimum provisions of the statute governed producer ceiling prices, the general operating standards developed by the agency were applicable to agricultural processors and distributors. In addition, specific instructions were issued as necessary to parallel the statutory requirements applicable only to agriculture. "Agricultural commodities" meant only the raw unprocessed commodity such as those for which parity prices had been issued. The degree to which a use, grade, seasonal, or locational differential, promulgated by the Secretary of Agriculture, was a binding legal minimum price was resolved through consultation with the Department of Agriculture. The disaster adjustment procedure was roughly similar to the earnings standard. The general rule was to adjust producer prices at least to the level necessary to return as much gross income as would have been received had producers received a crop of 85 per cent and sold it at legal minimum prices. Most of the other statutory provisions required no formal administrative instructions. There was little conflict of support programs with price control programs.

Summary.—The following operating instructions were issued to implement the statutory standards: (1) the earnings standard for industry adjustments; (2) the product standard for single commodities or product lines; (3) decontrol standards for minor items; (4) essential supply standards; (5) a series of individual adjustment provisions in the regulations themselves; (6) operating instructions and short-cut procedures for the Capehart and Herlong amendments; (7) out-of-pocket loss standards; (8) suspension standards; (9) legal interpretation where statutory standards were sufficiently explicit to make issuance of administrative rules unnecessary. Direct price control has, therefore, been bounded by an increasingly stringent set of general and specific statutory requirements, translated by administrative instructions into operating procedures. Accompanying these standards have been two procedural regulations outlining in detail the procedures for petitions, amendment, individual adjustment, protests, review, judicial action, and trade consultation.

Operating Programs

The operating standards evolved in a four-stage regulatory program: (1) voluntary agreements; (2) a general freeze; (3) broad-scale adjustments; (4) tailored regulations.

Two types of voluntary agreements were executed in December of 1950—individual responses to a hold-the-line request and industry-wide agreements to hold prices. The stabilization agencies did not consider that either voluntary price control agreements or selective controls would be effective. By late December attempts to extend the voluntary system were terminated.

The General Ceiling Price Regulation (GCPR) froze nearly all prices at the highest levels prevailing in the period December 19, 1950, to January 26, 1951. This regulation was untenable as a general control device since price relationships had been grossly distorted in the preceding wave of price rises. The regulation was not formally found generally fair and equitable nor was any effective avenue of individual appeal provided. However, in some areas, the GCPR fairly effectively covered pricing of new items, new categories, new sellers, and new services; adjustment of price differentials; export and import sales; exemptions; pricing techniques for cooperatives and their unusual types of business; records, reports, and other administrative procedures. More than 100 supplementary regulations have been issued, using the basic administrative and technical provisions of the GCPR but specifying particular prices or pricing methods for individual industries. About 170 other industries have been removed from the freeze through broad-scale adjustment regulations, specifically tailored regulations or through exemption.

There were three major difficulties in the general freeze:

- (1) Lags and squeezes occurred in the up swing of prices;
- (2) Firms observing the hold-the-line request or the voluntary agreements were grossly disadvantaged;
- (3) Pricing of new items and sellers without a base period history was often difficult.

For agricultural industries there were other difficulties in the freeze: pass through of increases in prices of raw material selling below legal minima at the freeze time; changing levels of legal minima; co-product pricing; differentials among branded items; and cooperative pricing. The supplementary regulations to GCPR were used only where these difficulties were minor and where specific pricing standards could be applied. Formulation of tailored regulations with uniform posted prices required considerable time. Therefore, interim manufacturers' orders were issued permitting self-calculation by individuals of selling prices prevailing in one of several pre-Korean base periods chosen at the seller's option: calculation of direct cost increases in materials and labor from the base period to specified cutoff dates; addition to the base period price of the average direct cost increase. Thus, in many cases, some ceiling prices were rolled back and others were rolled forward. There was little uniformity of ceiling prices. Posting of ceilings was generally impossible. Enforcement

was difficult. Administrative burdens were heavy both on business and OPS. There was difficulty with seasonal industries. Therefore, as with GCPR, supplements were used only where the general regulation was workable and equitable. In other cases, tailored regulations were developed.

Tailored regulations were the fourth and final stage of the program. It was intended that they be adjusted as precisely as possible to a single industry; that they conform in all respects to the pricing standards spelled out in the law and in operating instructions; that where possible, they provide for uniform and published ceilings; and that they provide adequate avenues for appeal and adjustment.

The Food and Agriculture Program

Price control in food and agriculture encompassed many techniques for several reasons: special statutory standards; correlative special operating standards; weight of prices in living and defense costs; obvious political elements; relation of wages to food costs; seasonal shifts; coordination with state and federal programs; complexity and instability in production and marketing; prevalence of atomistic competition; intimate relationship of price to production patterns. Therefore, both the objectives and techniques of price control in food and agriculture differ significantly from those in other areas.

Price control for food and agriculture under the freeze differed from other areas in two major aspects: (1) exemptions of live animals, seasonal products, products with volatile prices, raw materials produced under atomistic competition; and (2) a pass-through technique to adjust ceiling prices on commodities processed from raw materials with market prices below legal minimum levels. The parity pass through was a direct dollar-and-cent translation of increases in raw material market prices into the ceiling prices of processors and handlers with no cost absorption. GCPR prices had many disadvantages. They were individually calculated; adjustments reflected only raw material costs; enforcement was difficult; the technique was inappropriate to pricing by commodity exchanges, cooperatives, grower-processors, and open-end sellers. Hence, efforts were made at once to remove agricultural commodities from coverage by GCPR.

The broad-scale adjustment orders were not generally applied to food and agriculture. Options with respect to base periods and methods of calculation made these regulations inapplicable to seasonal commodities. There was danger of many freakish individual ceilings. In addition, the general deficiencies of such regulations are fully applicable to agricultural processing. A few processed commodities have remained under such orders. However, it has been an explicit policy generally to avoid use of these regulations.

The legal and operating standards coupled with the attributes of the agricultural industries required development of several major types of tailored regulations.

A *gross margin* technique was developed for the restaurant industry requiring sellers to maintain over a four-month compliance period the same ratio of sales to cost as prevailed in a specified base period. Rough control over average prices, quality, and quantity with wide flexibility in pricing of individual items was thus maintained. Compliance difficulties ultimately rendered the regulation untenable and a flat pricing regulation replaced it.

Specific *markup formulae* were developed in the wholesale and retail grocery trades. Both retailers and wholesalers were classified into four major groupings. Commodities were classified into 36 categories, each with an average markup. The over-all margin was considered adequate to meet the fair and equitable standard. No provision was made for regional or seasonal variation in classification of sellers, commodities, markups, or for general individual adjustment. However, ceilings were increased to meet the earnings standard. A nation-wide survey has been completed to assure that categories conform to normal trade practices and that ceiling markups conform to pre-Korean magnitudes.

A system of *community pricing* in the dry grocery field has translated the percentage markup regulations to uniform posted dollar-and-cent ceiling prices. This program involves specification of market areas; calculation of bulk-line wholesale prices by class of seller; application of prescribed markups to such uniform wholesale prices; and posting of the resultant retail ceilings by class of seller in order to increase enforceability and to minimize administrative burden.

Several *formula regulations* in canning and freezing authorized adjustment of a pre-Korean base period selling price for per-unit increases in direct operating costs and in raw material prices in order to adjust to brand, merchandise, style, and other differentials. As in the manufacturers' orders, problems involved selection of a generally suitable base; pricing of cooperatives, grower prices, and open-end purchases; merchant packers; and freakish individual prices. Had these regulations not been terminated by the Harrison amendment, a banding system limiting individual prices within specified limits probably would have been developed.

The *dollar-and-cent* flat price regulations were applicable primarily in the fields of fibers, foodstuffs, livestock, and meat. In the livestock field, the major problems were to develop effective ceilings on live animals; provide dollar-and-cents margins and prices at wholesale and retail; and assure adequate distribution of livestock and meat. Margins allowed to processors and distributors were required to reflect a fair and equitable

margin plus payment of actual market prices to producers up to the legal minimum level.

The *compliance price* for live cattle, applicable to the purchaser only, was based upon dressed grade and yield translated into a live cattle price through the carcass price specified in the meat regulation plus the slaughterer's zone differentials divided by a standard conversion factor. The result was the slaughterer's maximum calculated price. The purchaser only was required to be in compliance on all his purchases over a specified compliance period. This complex technique reflected the inherent difficulty of livestock price control. Nonetheless, the weight of livestock and meat prices in living and defense costs made such price control a first step in the food and agricultural program.

A correlative system of *distribution controls* on livestock and meat, to buttress the price control program, was effectuated through the allocation authority. Only registered slaughterers were authorized to sell meat. A quota system was established to assure that livestock was sold through normal channels only. Grading and grade marking were required. Records of production and delivery by grades were also required. The anti-rollback amendments of 1951 were primarily directed toward the livestock price and distribution control programs.

Despite the complexity and difficulty of price control, coverage by tailored regulation was generally faster and more comprehensive in this field than in others. By July, 1952, some 100 agricultural industries had been placed under tailored regulation. Exemption of minor food and agriculture items was undertaken early in the development of OPS. Suspension standards have been applied widely. Present policy apparently contemplates relaxation of control over major items wherever suspension standards are met but maintenance of tight control in those areas in which upward price pressures still threaten.

Appraisal

Impact in Food and Agriculture—The original mandate in the act has been weakened through progressive structures and exemptions. The freeze probably contributed to price stability more than any subsequent step. However, raw materials other than fibers and livestock could rise under GCPR in varying degrees before effective control could be imposed. There has been no method fully to prevent the built-in escalation of agricultural prices. Processor and distributor margins were controlled but could in fact widen on commodities remaining under the freeze if raw material prices declined. Many agricultural controls, in general with ceilings excessively high with respect to normal relationships and even to legal requirements, have been academic for months. Other farm and food prices press hard against ceilings.

There are administrative difficulties in these fields quite unrelated to the favored position of agriculture. Enforcement is difficult except where dominant firms exist. Short-run dislocations in marketing have been associated with almost every tight ceiling in atomistic industries. There appears to be little danger that long-run production distortions have occurred. Some technical problems—like co-product pricing—have never been satisfactorily resolved. Nonetheless, regulations have been issued for most industries—tailored to the attributes of each. They have been more workable than articulate opponents have indicated.

Perhaps because of too-close contact, it appears impossible precisely to appraise the effects of direct price control—or of direct price support, production control or market control—upon farm production or distribution patterns without detailed analysis of many regulations. In many segments of the food and agricultural areas, ceilings have and do hold prices. In others, statutory exemptions and the arithmetical vagaries of parity limit effective control to margins alone. In still others, there is little justification for direct intervention into pricing.

Direct Controls in Full Mobilization—Galbraith's "Theory of Price Control" is the outstanding analysis of these programs. The generalizations he has drawn apply fully to OPS. In imperfect markets only, direct control can be imposed and effectively policed by industry without allocations. It is indeed "relatively easy to fix prices that are already fixed." In most industries with dominant firms, business morals are generally high; such firms cannot afford to violate; regulations can easily be tailored to trade practice. As in OPA, there has been a long grace period between the spurt of prices and the emergence of shortages. Again, operation under decreasing costs has limited the necessity for upward ceiling adjustment.

Galbraith defines the major functions of direct controls as (1) to draw new resources—especially labor—into production and (2) to increase savings by creating an expectation of future price stability. In forestalling cumulatively higher prices at equilibrium levels and in restraining expansion of demand, direct controls can contribute significantly to smothering some of the causes of inflation itself. In many instances, control of price relationships can effectively guide production patterns. The usefulness of direct control as an adjunct to indirect controls should not be questioned seriously under conditions of full mobilization.

Direct Controls in a Siege Economy—The history of 1946 has largely been replicated. The law has been weakened and distribution controls have been virtually eliminated. There appears to be little legislative regard to the desirability of a clearly defined transition policy as direct controls are relaxed.

Most of the arguments of the opponents of direct control are recognized

as generally valid by the administration. No control agency can replace the market in equalizing profit opportunity. There will thus be almost continuous adjustment of control. However, it is not generally conceded that controls will indefinitely perpetuate themselves or that production patterns will be fatally twisted—although the twenty years of structurally similar direct controls in agriculture should provide a reasonable basis to assess these charges. Direct controls should at best be a supplement to indirect controls. However, in the context of today, even selective direct controls can restrain price increases not required by cost pressure on earnings. The functions of such controls to expand resources and to restrain demand can thereby be served. The cost-price interaction can surely be limited by direct controls wherever considerations other than price stability are the basic determinants of high-level government policy.

Agency Policy—At the moment, major pressure exists in the areas best suited for direct control. Here it is the policy of the agency to apply meaningful and biting regulations with increases given only under Presidential directive, statutory specification or the earnings standard. In other fields, the agency will retain ceilings in a stand-by status only.

There is a strong inflationary potential of indefinite duration. Resurgent panic demand may occur. Government demand may change suddenly. Costs—especially wages—will remain inflexible downward. The cost-price-cost interaction has lately been fast and sure. Should savings ratios decrease from destruction of the illusion of price stability, a saving factor in maintaining stabilization will be lost. In this mixed climate, a clearly defined general policy is emerging. The agency apparently bases most actions upon the following criteria: the present and prospective context neither requires nor supports a general system of direct control. However, there is no present justification for general decontrol. A policy of selective suspension is therefore being followed. Ceiling price increases shall be restricted to those required by law or to maintain specific levels of earnings. Administrative burdens must be minimized. Plans for future regulations and changes in legislation must be available to meet changes in the military and economic climate. Cost increases in specific areas arising from breaches of pricing standards must be passed through but their impact must be contained to the areas in which the breach occurred. Adjustment provisions both for industries and firms must be simplified. Food price control must be maintained where possible because of heavy weight in wage negotiations. A policy of exemption and simplification must be extended quickly. Fictional controls must be eliminated. Where legally valid and politically possible, ceiling prices will be reduced as market prices fall if no economic dislocation results. Price watching techniques must be developed. Trigger devices to reimpose control must be formulated.

There are clear-cut limitations upon the use of indirect controls in a cold-war economy. In general, such control authority is inadequate for its purpose. They are quickly relaxed and are adjusted slowly. There are significant time lags in the effects of such controls. The precise impact of indirect controls cannot be predicted. Political and public debt implications further limit the usefulness of the indirect techniques. Selective direct control probably could be maintained for a year or two more if properly supplemented by indirect controls. This policy poses difficult economic and administrative questions. Suspension must be translated into decontrol if certain markets remain soft indefinitely. Stand-by regulations become obsolescent as time passes. Pricing new sellers and new items clearly requires that new regulations be formulated in any area recontrolled after a significant period of suspension. The price level at which new controls should be reimposed is difficult to determine in advance. There are many restrictions upon following market declines with decreases in ceilings. Decontrol in fact generally follows after protracted periods of suspension. At least a nucleus staff to draft legislation, to analyze and appraise existing regulations, and to formulate new regulations must be maintained.

The two-pronged policy of OPS should be positive in both aspects. Suspension should be extended wherever feasible, if only to capture current market differentials if control is reimposed. Where price increases are not based on the maintenance of earnings, direct control should be used to prevent the reflection of price increases in cost increases and of cost increases in price increases *ad infinitum*. Direct control is a dangerous instrument which should be used only in dangerous times.

DISCUSSION

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In preparing this discussion I have had to rely on a draft of Dr. Mehren's paper which, although mailed August 20, did not come to my hand until two days ago. The difference between that paper and the revised draft which was handed me a couple of hours ago are not great enough to affect seriously my discussion. His oral presentation, while covering the same topics, sometimes seemed to bear little resemblance to the manuscript—but perhaps that was merely the effect of his powers of oratory.

The title of Dr. Mehren's paper, "Direct Price Control in Food and Agriculture," is a broad one. If one were to cover that entire topic in 30 minutes, it obviously would be necessary to do so through broad generalization. Dr. Mehren has chosen instead to deal only with the price ceilings and other restrictions to price increases imposed by the Office of Price Stabilization under the Defense Production Act of 1950, and subsequent legislation. In

one way the paper is broader than its title, for the first 21 pages deal with price control standards and programs generally, with no special reference to food and agriculture. Five pages are devoted to "The Food and Agriculture Program" and the remaining five pages to "Appraisal."

I am glad of the opportunity to be the first to congratulate Dr. Mehren on his discussion of the legal and administrative standards under which our direct price controls of the past two years have been carried out. His experience with OPS, recently as Acting Director of Price Operations, makes him preeminently qualified to deal with these matters—and who am I to take issue with him concerning them.

In a sense, the paper may be said to concentrate on some of the individual trees in the forest of direct price controls. But let me emphasize that these trees are highly important. Probably only those of us who have had experience in either OPA or OPS can fully appreciate that if one is to get through the woods of direct price control, it is necessary to reckon with such trees.

Nevertheless, I cannot help but wish that Dr. Mehren had devoted his attention more to the last section of his paper—the appraisal of the direct price controls of OPS—for it is this part which I find most interesting and concerning which I have questions to raise.

One of his first statements in the "Appraisal" section is, "The general freeze contributed largely to snuffing out the inflationary spiral of late 1950." My interpretation of the record is different. As I see it, the first upsurge of prices after the outbreak of war in Korea was strictly the result of anticipatory buying. Having fresh in mind the experiences of World War II, people were afraid of shortages and of inflation. Then in the fall of the year prices leveled off. This was soon followed by a renewed price rise, the character of which shows it to have been the result of the anticipated governmental price controls. Prices which were under the control of private suppliers, and which are ordinarily very slow to join any price rise, were raised in order to "beat" the price ceilings. The way in which the price freeze was applied, in other words, actually caused a rise of prices rather than snuffing out an inflationary spiral.

Dr. Mehren recognizes that under OPS controls "short-run dislocations of marketing have frequently occurred." He also states that "long-run dislocation of production has not occurred to any significant measure." With regard to the latter I would suggest that:

1. The effect of the controls on prices of food and agriculture products has been minor.
2. The production effect of such price influence has been moderated by the expectation of an early end to the controls.
3. There has not yet been time for all the long-run dislocations to show up.

In support of the first point, perhaps I should call attention to the great differences between the situation of the past two years and that of World War II. In the recent period, the fiscal and monetary conditions have not caused such inflationary pressures as in the earlier period. Price controls on foods could not have been nearly as effective as they were during World War II without extensive rationing, and we have had no such rationing in the past two years.

I am pleased to note that Dr. Mehren recognizes that direct controls can play only a minor role in preventing or limiting inflation—that they "should at most be a supplement to indirect controls." Even so, I suspect that the

majority of economists who read his paper will feel that he gives direct controls more credit than they are due.

In this connection I should like to call attention to a passage which, although it appears early in Dr. Mehren's paper, relates to the appraisal of the controls. He states that "any stabilization regulation must therefore be based on findings that the action: (1) promotes national security or foreign policy objectives; (2) prevents undue strains on the national economy; and (3) involves minimal interference with normal business procedures. To be valid any price action must be found consistent with these declared policy objectives. . . ."

While I suppose that a large number of the 17,000 employees of the OPS are devoted to making such findings, I have nevertheless considered them as nothing more than what might be termed the "legal eyewash" of direct price controls. The fact that Dr. Mehren's paper, presented to a learned society, gives them so prominent a place, however, suggests that he may take them much more seriously. This raises a question as to the true validity of many of the price actions which have been taken by the OPS. There certainly exists a large body of opinion—or perhaps I should say of suspicion—among economists that, so far at least as food and agricultural products are concerned, the direct price and wage controls of the past two years have: (1) been inimical to national security or foreign policy objectives; (2) caused undue strains on the national economy; and (3) involved unnecessary interference with normal business procedures.

The past decade has been a sad chapter in the annals of economic controls of the federal government. We have clearly failed to prevent inflation. But this is no indictment of Dr. Mehren or of the many other competent and intelligent people who have labored valiantly to try to make direct price controls work well. I was one of those who went to Washington in the days of OPA, knowing full well that in the absence of sound fiscal and monetary action, direct controls could not ultimately prevent inflation. And yet I, like many others, was willing to contribute whatever I could to checking inflation through OPA. I am sure that many of those in OPS have tried just as hard and are as much to be commended—or perhaps sympathized with—as were the people in OPA.

May I again call attention to the fact that Dr. Mehren has made a competent and helpful discussion of some of the legal and administrative standards of price control and of how these restricted the ability of OPS to prevent inflation. This is an important aspect of direct controls to which all too little attention has been given in appraising the place of such controls in preventing inflation.

THE MANAGEMENT OF RESERVE STOCKS

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THE title which has been given to me for discussion seems to imply at least two assumptions, both of which I am willing to accept. One of these is that there are going to be reserve stocks of certain storable commodities and the other is that there will be some amount of management of these stocks, presumably as a part of our national policy.

Instinctively, as consumers, the idea of impounding surpluses in years when crops are good against the time when we have need of them appeals to most of us. On the other hand, our experiences with the market have taught us the evil consequences of "surpluses" of whatever commodity we have to sell, or the "sweet uses" of scarcity.

So we constantly are running into the problem that, politically, "it is very easy to withdraw commodities from the market as a means of raising prices but difficult or impossible to liquidate these stocks in accordance with any economically sound plan of 'orderly marketing' or production adjustment."¹

For some time, economists have been pointing out the fallacy of turning the storage program into a device for supporting prices above their free market level. We have argued that a clear distinction should be made between *stabilizing* prices and *supporting* prices above a level that will clear the market over a period of time.² The use of storage for price support purposes has probably done much to cause the fear of inventories. The chief justification for a program of impounding surpluses is that the commodities will be needed for future use, and a basic requirement of a storage program is that commodities must flow freely out of storage when they are needed. But it becomes more difficult for stocks to flow freely out of storage when the stocks go into storage at prices significantly above the level which would clear the market over a reasonable span of time.

Usually we have said that storage programs could not and should not be divorced from price.³ Obviously if some of a commodity is stored in a year of unusually heavy production, the price will be higher than it would otherwise have been; but if the stored supply flows back into use

¹ *Turning the Searchlight on Farm Policy*, Farm Foundation, 1952, p. 37.

² See for example, Layton S. Thompson, *Bulging Bins, Blessing or Menace*, Special Release Montana Agricultural Experiment Station, 1952, p. 4.

³ In a recent article in *This Journal*, W. H. Nicholls states that the time is ripe to establish new criteria of storage policy in physical rather than price terms. See May, 1952 issue, p. 203.

in a year of short production, the price will be lower than it would otherwise have been. The important thing to see is that we get different results if we set out to stabilize prices and the flow of commodities through time than if we set out to support prices through time.

In this short paper, I wish to advance three propositions which may make some contributions to our thinking. First, the need for establishing reserve stocks is greater than some of us have recognized, partly because we have paid too little attention to changes on the demand side and emphasized fluctuations in supply. The second proposition is that actually a reserve program for storable commodities has operated for about two decades in a fairly satisfactory manner out in the world where people live in spite of the fact that the economists' models were not always used as criteria of policy.⁴ The third proposition is that the needs for a reserve program, or the benefits to be had from a properly conceived reserve program, are such that it behooves the economist to continue to search out and point out the issues involved in order that he might make some contribution to the process which is very likely to be carried on anyway by "practical" men. In other words, I decry the tendency of some of my colleagues to throw up their hands in despair that a reserve program can be properly operated.

The Need for Reserves

We are slowly, and apparently with considerable stress and strain on our nervous systems, tearing ourselves away from our depression-born fear of surpluses of food and feed products. We are beginning to see that if we attain a domestic population growth which many students of population foresee within the next 25 years or so, it will tax the productive capacity of American agriculture to feed the people a diet which we consider acceptable.

Our full productive capacity will be needed to feed the livestock and poultry which will be required to furnish our growing population with meat, dairy and poultry products. When the various livestock and poultry industries have been expanded almost to feed-producing capacity, it ought to be obvious what would be the effect on these industries when a very short feed-crop year is experienced, such as was experienced, for example, in 1934. We have received a taste of what can happen in certain sections of the United States in the past few weeks. Newspapers have carried items regarding the need for feed reserves in the Southeast.

A reserve program for storable commodities is essential not only for stabilization purposes but as an incentive to growers to produce at high

⁴ See discussions in the May, 1952 issue of *This Journal*, by W. W. Wilcox (especially footnote quoting J. M. Brewster, p. 176) and by K. H. Parsons, p. 226.

level rates, even through a series of favorable crop years to offset a possible series of poor crops. Actually, what we are saying is that a program of impounding surpluses becomes more important when agriculture is operating at capacity levels than when there is excess capacity.

Regional considerations are important, too. If any important part of the increased supply of livestock and poultry products is to be supplied by the Great Plains area, where feed production is notoriously erratic, then a feed reserves program geared to the needs of that region must be considered. The realization of the need for feed reserves in the semi-arid regions is not of recent origin, of course, but it takes on added significance when we contemplate a considerable expansion of production of livestock and livestock and poultry products in that area. Farmers and ranchers in Montana are building storage facilities, and in our shop we are at the present time studying the place of storage in the economy we foresee for our area. Possibly one of the future developments will be the invention of satisfactory physical techniques of storing forage products⁵ and institutional techniques for financing such storage.

We can hope, perhaps, that the possibility of emergency demand for reserves of storable agricultural commodities for defense purposes is not of long-term nature. Certainly, there is a fair amount of agreement that while we are feverishly going about the process of building up our national strength for defense purposes, it makes sense to carry what are often termed "strategic" reserves of grains and fibers.

From the standpoint of national defense needs, an examination of the recent record furnishes much food for thought. During the five years of war, from 1941 to 1945, 5.4 billion bushels of wheat were used by this nation. A little less than five billion bushels were produced under *extremely* favorable weather conditions and about 400 million bushels were carried over into the period of July 1, 1941. Suppose that the climate had been as it was just 10 years earlier, from 1931 to 1935, when only 3.4 billion bushels were grown on a *greater planted acreage*. There would have been approximately two billion bushels less of wheat for the war years. Even if yields had been *average*, the production would have been only four billion bushels on the 1931-1935 acreage, or about one billion bushels short of what we used. Can we afford to gamble that bumper crops will always be furnished us with our wars?

A stabilization store will not build up a stockpile for defense purposes, although it would lessen the danger that the economy might be caught short in the middle of a drouth period just when we needed supplies for emergency purposes. By their very nature, stabilization supplies will

⁵ For a good example, see A. F. Swanson, "Making Pellets of Forage Sorghum," 1950-51 *Yearbook of Agriculture*, pp. 353-356.

build up in good years and be depleted in poor crop years. A store for stabilization purposes, therefore, is not the same thing as a store for emergency purposes, though the two are not unrelated.

The Reserve Program Has Worked

In its 18 years of operation, the cost of the Commodity Credit Corporation has been less than one billion dollars, and the bulk of this cost was incurred in supporting the price of potatoes and eggs, two commodities which should not be classified as storable agricultural commodities. "But," we economists are prone to remark, "the program would have been a miserable failure had not a war come along to bail it out."⁶

"Twice in its history, the C.C.C. has been relieved of highly embarrassing accumulations of stocks, both times by war," writes Karl Brandt.⁷ "The use of stocks to meet the initial shock of war or defense mobilization has now been demonstrated twice within the last decade, once following our own entry into the war in 1941 and again following the outbreak of hostilities in Korea in June, 1950," write Messrs. Wells, Fox and Wilcox.⁸

It depends some on one's point of view! If we see stocks of useful goods as evidence of national weakness, then we are certainly thankful when something comes along and "bails us out." If we see stocks as an element of national strength, then we will welcome them precisely because something is almost certain to come along which requires their use.

Emergencies of the type represented by war are certainly a part of life, but they were not a part of our models relative to offsetting the fluctuations in production due to weather variations. One of the reasons economists have "shied away" from demand fluctuations is that "demand changes definitely do not occur in random sequence"⁹ and therefore we have had difficulty in treating them in our analysis.

Economists Can Make an Important Contribution

I believe that a reserve program is to have an important place in this country and that the economist can make an important contribution in the process of developing a "properly conceived" program.¹⁰ The proc-

⁶ See for example, T. W. Schultz, *Agriculture in an Unstable Economy*, McGraw-Hill, 1945, p. 176.

⁷ Karl Brandt, "Agricultural Policy During Rearmament," *This Journal*, May, 1952, p. 199.

⁸ *Reserve Levels for Storable Farm Products*, Senate Document No. 130, 82nd Congress, 2nd Session, p. 8.

⁹ *Ibid.*, p. 7.

¹⁰ The 1952 platforms of each of the major political parties include a "plank" expressing favor of commodity loans on "non-perishable" or "storable" farm commodities.

esses through which "policy" is evolved in a democracy are complex, but certainly ideas are ever important. However, we must base our ideas concerning needed reserves not on past problems of surpluses but on future needs for feeds and foods. Our greatest future problem may be how to build up adequate reserves of feeds for livestock rather than how to rid ourselves of surpluses.

It is not my purpose here to say how great reserve stocks should be. I recommend to the reader Senate Document No. 130, which is an excellent discussion of reserve levels. The level of stocks to be carried to offset probable variations in production and in demand will depend on the value the people attach to achieving a given degree of stability relative to the costs involved.

There are a number of problems to be faced in the refinement of storage programs, and it may be in the study of these problems that the economist will make some of his best contributions. The following are some examples:

(1) *How to release supplies from stocks when needed, particularly by farmers for feeding purposes in poor crop years.* Considerable thought is needed on ways and means for farmers to get feed grains out of storage in years of short crops. Perhaps the insurance device can be adapted to this use. Some farmers can be encouraged to maintain cash reserves for this purpose or even to store the grains themselves. But there are certain to be situations, especially during prolonged drouths, when these will be inadequate. Perhaps the government should arrange to lend grains to farmers to be repaid in grains. Some have suggested that individual farmers should not be expected to carry reserves for more than some distance into a prolonged drouth, using credit to bring themselves on out. This problem is of particular significance in areas of highly variable rainfall.

(2) *How to prevent large stocks from depressing prices unduly.* The statement is often made that large stocks in storage will have a depressing effect on price. This is not necessarily true. It is not the amount of a commodity in existence which effects the price—it is the amount which will be offered for sale. It is important, then, that a storage program be operated according to clearly defined and announced principles and objectives which the trade will be able to take into account. Inventories which are stored for the purpose of releasing in short-crop years will, of course, affect the price where released, which is part of the desired effect. Stocks held for national emergency needs would also affect market price when released, which is probably desirable. To administer a storage program so that only the desired effects on price are realized will not be an easy task.

(3) *How to minimize the effect of political pressure.* It will not be

possible ever to remove from the storage program or any other program the effects of political pressure. It may be found, however, that there are means of lessening the effect of pressure group action. Probably the first requisite is that citizens understand the principles and objectives of a sensible storage program. Here is an important field for study.

I do not consider the threat of pressure group action completely alarming. For every pressure, there is usually a counter-pressure. If, for example, farm pressure groups cause the storage program to be used as a price support program, other groups likely will eventually find the cost of the subsidy high and call a halt.

(4) *How to integrate a national storage policy with our foreign trade policy and with world-wide attempts to improve the distribution of basic food commodities.*

(5) *How to integrate a national storage policy with other national policies, some of which will be supplementary or complementary and some of which may be in conflict.* This is particularly important in relation to various counter-cyclical measures. In what way is holding title to stocks of grains or other crops different from holding title to any other tangible thing in time of falling price level—land, livestock, farm machinery, railroads, factories, inventories of goods, or hydro-electric plants? What costs of holding inventories of feed and food grains should be borne by private individuals or groups and what costs should be borne by all the people?

(6) There are certain physical problems, including the danger of deterioration of grains in storage. Deterioration can be prevented by replacing stored stocks with new supplies as often as necessary, but there are costs involved in the physical handling of the grain. More information is needed concerning such costs under varying plans of operation. Allowance needs to be made for quality, which adds considerably to problems of administration.

DISCUSSION

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Basic questions to be answered in a discussion of "Management of Reserve Stocks" are as follows:

- (1) What commodities shall be held in reserve?
- (2) Who shall be responsible for acquiring reserve stocks?
- (3) When should reserve stocks be acquired?
- (4) Where shall the reserve stocks be stored?
- (5) Under what circumstances shall reserve stocks be released?
- (6) Who shall bear the risk of price change?
- (7) How shall stocks be acquired?
- (8) What size reserve of each commodity shall be acquired and who shall make this determination?

(9) In what form shall commodities be held in storage?

(10) Shall a separate storage program be initiated for each policy objective (e.g. stabilization, emergency, etc.)?

(11) What will be the social effect of alternate courses of action with respect to reserve stocks?

(1) The first question, "What commodities shall be held in reserve?", has not been answered by Thompson, even though he is concerned primarily with grains. Perhaps it is not important at this stage of the discussion to identify each commodity, but it would seem much could be gained by an examination of problems associated with the stockpiling of individual commodities. Surely the problems associated with acquiring reserve stocks of wheat differ from corn, corn from rubber, rubber from coffee, etc. Do the generalizations fit?

(2) The second question is "Who shall be responsible for acquiring reserve stocks?" It is altogether too easy to assign this responsibility to some agency of the government, either state or federal whether they want the job or not. I would like to append to Thompson's list of things to do, an assignment to develop a semi-automatic system that would place a minimum responsibility upon government in the acquisition of reserve stocks.

(3) Thompson deals with the third question, "When shall reserve stocks be acquired?", by referring to two kinds of stocks, emergency reserve and stabilization reserve. Presumably, an emergency reserve would be acquired in anticipation and during periods of international stress and strain and would be dispersed during and after such periods. A stabilization reserve would be acquired when production was above normal, or utilization below, or both. This second kind of reserve would be disposed of under opposite conditions. Two problems that need much further study in this connection are to define an emergency and to define normal conditions of supply and demand.

(4) I expected Thompson to deal more fully with question four. The current problem of the location of reserve stocks is of considerable importance from the standpoint of management. It is and has been made a major issue of political parties seeking to elevate their candidate to high office. To illustrate the need for more information and/or the application of information already available on this question, I want to point out differences which sometimes crop up.

In May, 1950, the Farm Credit Administration, in cooperation with the Oklahoma Agricultural Experiment Station, published results of research on certain aspects of the economics of grain storage.¹ A major conclusion was that farmers cannot afford to store wheat on the farm if commercial storage is available. Six months later, the state chairman of the Kansas Production and Marketing Administration Committee declared more farm storage was needed to handle the Kansas wheat crop.²

(5) Under what circumstance shall reserve stocks be released? Thompson does a service by bringing this problem to our attention. Presumably, if different kinds of reserves were established, there would be different criteria for the release of each. A reserve based upon physical needs probably would be released according to a policy based upon some relationship between physical

¹ Hall, Thomas E. and others, *Where and How Much Cash Grain Storage for Oklahoma Farmers*, Farm Credit Administration Bulletin 58, May, 1950.

² Statement of November 28, 1950. See also *The Northwestern Miller*, March 20, 1951, for a similar statement by Charles F. Brannan, Secretary of Agriculture for the United States.

requirements and supply. A reserve for stabilization probably would move into and out of storage on the basis of price relationships. An emergency reserve probably would move into and out of storage based upon some estimate of the condition of emergency. What are the economic interrelationships between the different reserves involved?

(6) Our sixth question, "Who should bear the risk of price change?", is perhaps the most intriguing. In our society are individuals who desire to assume risks of various kinds. Many people join together in one way or another to jointly bear risks of fire, accident, etc. In the marketing of certain commodities—such as wheat—we find commodity exchanges organized to perform, among other things, the function of providing an opportunity and facilities to individuals who want to bear risk of price change. How will the presence of an "emergency reserve" and/or "stabilization reserve" affect this function? Are we, through the tax gathering arm of the government, going to force society to assume risks of price change or will we continue to give those who want to bear these risks the opportunity to do so?

In this connection, it is my impression that most writers assume the problem of reserve stocks is primarily the responsibility of government. One of the most pressing reasons is the risk of price change. It seems easy to ask the government to assume this function. But, who is government? It is a form of collective action. So what we are doing when we shift risks to government is to force the cost of bearing risk of price change upon everyone even though some may not care to participate. That may be the way we want it—but let us not be too ready to accept this solution without careful examination.

(7) Number seven of our questions is also a current problem of management. Shall government enter the market and purchase reserve stocks? If so, when? Shall reserve stocks be acquired when prices are depressed ("stabilization reserve") or when an emergency is foreseen ("emergency reserve")? Should government require each producer or processor to "set aside" certain quantities? How shall reserves be earmarked? Shall the market be so organized that above normal inventories are maintained by private businesses, thus creating a reserve without direct management by government? The way we answer the question, "How shall stocks be acquired?", will have a major influence upon the organization of the marketing system and we will do well to give it serious thought.

(8) Question eight, "What size reserve for each commodity shall be acquired and who shall make this determination?", is quite difficult to answer to the satisfaction of all. Thompson pointed out some of the difficulties in determining the size stocks which should be acquired. It seems to me that we need to take each commodity and analyze the minimum desirable working stocks from the standpoint of potential needs during the next several production periods ahead. It would seem to me that there needs be a compromise between the variation in the production of agricultural commodities, such as feed grains and the desires of consumers to consume the final products. It does not seem a sound national policy to have extreme variation in consumer's goods from year to year. Some improvement could be made in adjusting to the variations in weather and the workings of the livestock-feed price ratio. It would, however, seem to be a sound policy to expect consumers to adjust demands within reasonable limits. Consumers and producers, therefore, would share in adjusting to changes in production.

(9) The answer to question eight is related to question nine which is: "In

what form shall commodities be held in storage?" For example, shall we maintain reserves of feed grains in the form of corn or shall we maintain those reserves in the form of animals in feed lots? Shall we maintain reserve stocks of rubber in the form of crude rubber or shall we have them in the form of automobile tires? Of course, each commodity needs to be considered on its own merits. It is easy to recognize the difficulty of giving an adequate answer to this question independent of answering the other questions. However, the difficulty in answering the question should not lead us to ignore it. Here again, it is my belief that this question points out the need for taking each commodity separately in analyzing a reserve program.

(10) Question ten is "Shall a separate storage program be initiated for each policy objective?" It seems to me that the separation of stocks into two classes, those which are held for stabilization and those which are held for emergency is not too useful. An adequate "stabilization reserve" would likely be adequate to meet emergencies if it actually stabilized. If not, then we are not stabilizing our economy through the use of reserve stocks. In an earlier paragraph, it was pointed out that stabilization stocks likely would be those acquired or set aside through marketing quotas, etc. when prices were low or depressed; to be released when prices were high. Reserve stocks established when an emergency was foreseen would be called emergency reserves; to be released during and after the emergency. Suppose an emergency were foreseen at the same time prices were depressed, how would we then classify the reserves thus created?

In most discussions of the need for emergency reserves, writers point out the difference between the weather during the early 1930's and the early 1940's. Just what is the emergency insofar as stocks of agricultural commodities are concerned? Is it a question of war or peace, is it a question of maintaining our economy at some level of operation, or is it something else? The emergency reserve of feedstuffs created during a period of international tension would have essentially the same effect on stabilizing prices as a reserve created if someone could have foreseen the drought years of the 1930's. The establishment and operation of stabilization reserves of feed grains, for example, essentially would operate to place an even flow of livestock products in the hands of consumers. Is not this also the objective of the operation of an emergency reserve?

(11) The last question is "What will be the social effect of alternate courses of action with respect to reserve stocks?" I hesitate to raise this question, because certainly a majority of people realize that there are bound to be changes in social and political structure with the operation of a program of reserve stocks of great magnitude. We are more prone than not, however, to forget to shift over into the field of social relations long enough to analyze and adequately appraise the effect of economic actions on social and political organization. I want to append this to our discussion here as a warning flag that it must not be overlooked in an adequate appraisal of the question at hand. It is my opinion that it makes a great deal of difference to the organization of our society as to how reserve stocks are managed. We have but to observe our neighboring country to the south, Argentina, and ask ourselves why it is that they are importing wheat and rationing meat this year. Blueprints sometimes do not work.

In summary, I have raised certain questions which should be appended to Thompson's list of tasks which economists can work on with regard to

reserve stocks of commodities. Several other problem areas have not been discussed though some were mentioned by Thompson. Specifically, he mentioned the preservation of stocks. This problem has received attention for centuries, yet I suspect we have only scratched the surface. He also mentioned problems of international relationships which currently are receiving the attention of the Council of the Food and Agricultural Organizations of the United Nations. I agree with Thompson that the economics of reserve stockpiling need to be studied much more thoroughly. Heretofore, we have but scratched the surface. In this discussion, I have raised questions in the hope that further thinking on these problems will be stimulated.

THEORETICAL CONCEPTS IN LAND ECONOMICS

Chairman: John Timmons, Iowa State College

SOME THEORETICAL ISSUES IN ECONOMIC DEVELOPMENT

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ANY science, social or non-social, acquires its particular characteristics largely from the demands which society makes upon it, and from the opportunities for service which society creates for it. This could be demonstrated by an examination of the basic changes in any science.

For example, we have seen economics molded, in turn, by three great societal demands. First came the demands of a rapidly developing industrialism in nations of the world dependent upon other nations for much of both their raw materials and their markets. In response, economics developed an integrated theory around the concepts of comparative advantage, division of labor, and the effectiveness of competition in allocating productive factors. The policy counterparts of these concepts were represented in the doctrines of free trade and domestic *laissez-faire*. This molding presented us with classical economics, amended by the Austrians, synthesized by such men as Marshall, and J. B. Clark, and currently designated as Neo-classicism.

A second great molding circumstance resulted from the emergence of concentrated economic power centered in the great corporations. Somewhat belatedly, economics adjusted its focus. Then came elaboration of theories of monopoly and monopolistic or imperfect competition (e.g. Chamberlin, Robinson, Triffin) and, working in quite a different vein but on the same problem, the work of some of the so-called "Institutionalists," particularly Commons.

A third great molding process was, of course, brought about by the mammoth depression of the '30's, which brought into existence the many aggregative theories of the functioning of the economy—attempts to understand why an economy should fail to realize its obvious, and previously attained, productive capacities. Thus the terms "Keynesian" and "Macro-economics" began to denote a new and very different body of economic postulates than had theretofore been commonly encountered in our profession.

In each of these remolding processes, the theoretical innovations were treated originally as radical departures from established propositions of economic theory. Indeed, they were cast essentially as refutations of older approaches. But once they were clearly articulated, a process of synthesis

set in—involving modifications of both old and new formulations working toward the establishment of a body of consistent and inter-related propositions, covering the range of empirical situations of both the older and the newer theoretical systems, all within the framework of a unified body of systematic theory. This process we may refer to, not as “economic progress,” but as the “progress of economics.”

Today's Problems in Economic Development

Today society is making demands upon economics which will have remolding effects of great magnitude. I refer to the demands the world is making for policies directed toward its economic development. What can be done to raise in fairly rapid and preferably in a predictable fashion, the level of living of the people? Since the majority of the most underdeveloped nations of the world are predominantly agricultural, this burden is falling most heavily upon agricultural economists.

In deep sincerity I agree with Professor T. W. Schultz, that economics has not, as of today, taken us very far toward a solution of this type of problem.¹ This is not an indictment. It is merely a judgment of fact. And, I should be no more immodest than foolish were I to believe that this paper will make any substantial headway on the problem. But I do believe some real progress might eventuate from the simple fact of this group's centering its analytical attention upon this problem for these several minutes.

Desirable as it would be, I shall not attempt a definition of economic development, as the issue is much too involved for a paper of these dimensions. Rather, I should seek agreement on some of the *conditions* of economic development, i.e., things which would make economic development possible, and then discuss some of the theoretical issues related thereto.

The *conditions* of economic development which I shall discuss, and upon which I believe we can agree, are as follows:

- (1) An increase in the aggregate resources of the world, or of the nation in question.
- (2) An improvement in the state of the productive arts (i.e., technological development), so that a given amount of resources can be transformed into a satisfaction of more human wants.
- (3) A distribution of the fruits of the economy in such a way as to increase the aggregate social utility from the production from these resources.²

¹ Comment made by Schultz in a talk before the Knoxville Economics Club, February 27, 1952, Knoxville, Tennessee.

² The problem of measuring or identifying an “increase in the aggregate social utility” is very complex and will not be discussed here. It would be more accurate to

This is not a complete list, but I believe we can agree that each singly, or any combination of them, makes for economic progress or development. Let us comment upon each of these conditions in order, pointing up briefly the present position of economic theory as it bears upon the particular condition of economic development being discussed. I shall not, in the little time available, be able to give even these three conditions adequate attention; and so shall concentrate primarily upon condition number (1), resource development.

Resource Development

First, a few comments upon the meaning of the term "resources." One's instinctive first reaction to the proposition that we may bring about economic development through increasing the world's supply of resources is, I am sure, negative. We think of the supply of resources as being fixed—that, in fact, we are depleting them at certain specific rates. The very concept of resources implies a fixity, imposed by nature. But is this necessarily true? Do we not have here a case of the same kind of erroneous reasoning which led early classicists to draw improper conclusions in their rent theories from the assumption of the fixity of land supply as a productive factor?

Surely any theory of economic development must be a long-run theory—though joining issues, we should hope, with accepted theories of the shorter run. Surely, also, it must be a theory of economic dynamics, a theory which treats *as variable* any factor which is strategic to the solution of the problem under analysis, and which may be expected to vary over the length of run to which the theory is addressed. This being the case, and in view of the obvious relationship of the supply of resources to economic development, the question of whether the supply of resources be treated as fixed (at the upper limit) or whether it be treated as a variable, is of strategic importance. The basic question is, then, what is the long-run meaning of resources? And the derivative question is, how shall we treat resources in long-run economic analysis?

I owe to Professor Stigler the reminder that, according to the elementary postulates of physics, energy and mass are theoretically interchangeable, without limit.³ And mass and energy, in their manifold forms

say that "aggregate social utility" is immeasurable, but that many "welfare economists" believe it is possible to determine which of two policies provides for the greater aggregate social utility. See, e.g. E. J. Mishan, "The Principle of Compensation Reconsidered," *Journal of Political Economy*, August, 1952, pp. 312-322. However, in what to me is a stronger argument, M. W. Reder denies even this power to formal theory. See his *Studies in the Theory of Welfare Economics*, New York, 1947, pp. 94-100. Neither will we consider the question of whether merely an aggregate increase in want satisfying goods is sufficient, or whether there must be a *per capita* increase, to constitute progress or development.

³ George F. Stigler, *The Theory of Competitive Price*, New York, 1942, p. 33.

and combinations, are what we mean, ultimately, by the term "resources." Certainly there is no shortage of mass, in the aggregate, on this planet. And the supply of latent energy remaining to be tapped by the instruments of mankind completely defies estimation. I needn't bore you with the superlatives and statistics used to describe the possibilities of atomic energy in order to prove this point. Surely the upper theoretical limit, imposed by nature, upon the supply of potential resources is not something which needs give us concern.

This is not to say, of course, that the supply of available resources is not an important aspect of any economic problem at any given moment of time. But it does clearly imply that the idea of a fixed supply of resources—a fixity imposed by nature and beyond the control of man—is an erroneous idea. It implies that in the long-run, the limits on the supply of resources are the limitations of the scientific and organizational powers of man to construct these resources from the sum total of mass and energy which nature provides. In long-run analysis, the term "resources" must be treated as essentially synonymous with the sum total of all the processes by which man adapts and creates his environment to suit his purposes, through the instrumentality of human knowledge—scientific and otherwise. The accepted terminology by which we identify resources as "objects" apart from such knowledge, rather than as the total knowledge-environment relationship, is a short-run concept, and may be legitimately used only in relatively short-term analysis—that is, in periods too short for human knowledge to change appreciably the powers it has to command its environment to its own purposes.

This clarification of the long-run meaning of resources has, I feel, a direct bearing upon the nature of the modification that must be made in existing economic theory as we attempt to adapt it to deal with problems of economic development. This is because such a theory must treat the supply of resources as a variable—indeed as a *dependent* variable.

Existing economic theory, addressed to different issues, does not do this. Both the so-called "Micro" and "Macro" economic theories treat the supply of resources as constants, or as parameters, in their formulations. Both are the same in the sense that they are concerned with getting the maximum economic output from the given resources. Micro economics is concerned primarily with allocative efficiency, and Macro economics with operational effectiveness, of an economy having a given state of technological accomplishments, given resources, and a given distribution of ownership or control over those resources. Such approaches will undoubtedly have much to contribute. But they are relevant primarily to the problem of realizing maximum advantages from an economy at given levels of development, and are not directed at the problem of development itself.

The problem here is somewhat like that in biology. There are important equilibria situations in the animal body that deserve and receive study—nervous equilibrium, blood pressure equilibrium, etc. One may abstract from the phenomenon of growth in studying these equilibrium problems; but in studying, say, the causative factors in the growth of a child, one cannot hold “growth” constant as he would when studying these equilibria. What results is a theoretical system which embraces the phenomena of both growth and equilibrium. The goal in economics is, of course, to introduce necessary modifications so that we may have an integrated structure of economic theory to direct at the problems of economic development as well as at the problems with which theory is now able to deal.

Assume for a moment that we can agree that the foregoing constitutes a meaningful long-run redefinition of the term “resources.” Is it enough that we take cognizance of this fact and then proceed without modifying our theory? I think not! If our theory is to have any value as we work on problems of economic development, it must provide some power in the appraisal of alternative national or area policies of economic development. If we are dealing with a situation where an increase in the aggregate supply of resources (in the above meaning of the term) is one of the projected ends, we cannot analyze such policies with theories that have no way to treat resource supplies as a dependent variable. We may not only fail to get the right answer; we may get the wrong one. Policy A might result in a more productive organizing of *existing* resources than does policy B; but the increase in basic supplies of resources—in their long-run meaning—may be so much greater under B than under A as to far outweigh policy A’s greater allocative efficiency. Surely questions like these are fair game for economics.

I can illustrate this further by reference to a problem with which we are all familiar, that of capital allocation between agriculture and the rest of the economy. Let’s assume we have a primarily agricultural nation underdeveloped industrially, a nation with a low marginal productivity of labor in agriculture as compared with that outside agriculture. Let us assume further that in this country the marginal productivity of capital in agriculture is high relative to that outside of agriculture.

The policy solution, derivable from these facts and existing theoretical systems, is straightforward and simple: Let labor flow out from agriculture into the rest of the economy, and let capital flow from other parts of the economy into agriculture, until the marginal productivities of each factor is equal in agriculture with that outside agriculture. This defines the condition of optimum resource allocation.

From the viewpoint of the long-run economic development of the nation, and incident thereto the economic development of its agriculture,

is this necessarily a valid proposal? Could it not be possible that, instead, a transfer of capital from agriculture to some other sector of the economy might set forces in motion that would so favorably affect the employment alternatives of the farm workers as to greatly outweigh the possible advantages from having a little more capital to mix with their labor in agriculture? In fact, have we not seen some national experiments in certain countries which, regardless of their unfavorable side effects, have demonstrated the likelihood of the validity of this later conclusion?

I can anticipate the reaction that such a statement really implies a contradiction of the basic assumptions—that it, in fact, implies that the marginal productivity of capital is higher outside than within agriculture. With this, I disagree. Within the restraining assumptions imposed by traditional theory of a *given* “state of the arts” (i.e., level of technology) the marginal productivity of capital in agriculture is, by our assumption, higher. But in the long run and dynamic dimension of the problem, these “given” characteristics are not only variables, but are dependent upon the policies adopted. The theory leading to the recommendation to transfer capital into agriculture deals merely with the allocative problem *at a given level of development*—while the problem itself is a problem of economic development in which these factors, held constant by the theory in the first case, are really the strategic variables.

Improvement of Technology

We have discussed at some length a few of the theoretical issues posed by the proposition that the supply of resources is one of the variables upon which economic development depends. I shall comment briefly upon the second “condition of economic development” proposed earlier, that of an improvement in the state of the productive arts, i.e., technology. The question again arises, how must we deal with this factor in long-run analysis?

I’m sure that what has already been said is sufficient to demonstrate that, in the long run, technological development is also a dependent variable—that is, that it may depend upon policies chosen and so cannot be treated as a constant in analytical structures designed to appraise these policies. In fact, in the long run, distinctions between the terms “resources,” “technological development,” and “the state of the arts” become extremely fuzzy, since in essence all refer ultimately to the aggregate control of man over nature, achieved through the instrument of his systematized knowledge. Shorter run distinctions between these factors may be made; the legitimacy of the distinctions depends upon the character of the problems to which the resulting theoretical structures are addressed.

Simply, the basic point is that the principal raw materials of economic

development are the abilities of the nation in question (or mankind in general) "to make and remake a universe of its own"—to copy a phrase from Carl Brinkham.⁴ And this relationship between man and his environment is a two-way equation. Not only may certain policies influence the amount of control man may have over phenomena; but also, they may greatly affect the character of man himself. Men simply work more energetically, more effectively, and, most important, more creatively under some forms of social and economic organization than under others. I should like to quote a statement on this point from comments made by Leonard Elmhurst to this Association at its 1947 meeting.

Commenting upon American policies of post-war reconstruction of Europe, he said: "It is well then to recognize that . . . a people . . . when inspired by an appropriate expression of trust and affection, . . . are capable of releasing astonishing bursts of energy and enthusiasm.

"When released from fear and deeply inspired they are capable of an effort so incredible as to be comparable in the field of the physical sciences to the release of energy from the atom."⁵

Surely, if there be any truth whatever in this view, this aspect of any policy question pointed toward economic development must be given its due weight. By due weight we must mean, of course, that it be treated on an equal theoretical basis with such issues as allocative efficiency.

Fair Distribution of the Fruits

In my few remaining moments, I should like to make a brief comment upon my third "condition" of economic development: Namely, "a distribution of the fruits of the economy in such a way as to increase the aggregate social utility."

In terms of the commonly accepted distinction between the economics of production and of distribution, we have thus far been speaking of the former. Our comments have dealt with theoretical issues in so-called "production economics" which must be faced as we shift into the problem of economic development. But problems in the theory of distribution are equally manifest and probably harder to deal with. Here, of course, the issues of value and valuation are at the center of our problem. I shall not attempt any discussion of this problem, except to make the following observation. Distribution theory today concerns itself, in essence, with tracing out the effects of various policies in distributing economic fruits among persons who own or otherwise command control over resources. (One's own labor or other personal abilities are, of course, in this sense included among his resources.) In current theory, distribution

⁴ *Encyclopedia of the Social Sciences*, New York, 1932, Vol. VIII, p. 248, Col. 2.

⁵ *This Journal*, February, 1949, p. 291.

of ownership or other control of resources among people is "given."

In terms of the dynamics of economic development, however, the real problem of distribution is: "How does ownership or other control over resources come to be distributed in the manner it is?" And, is this the proper distribution? The "givens" of traditional theory are the real subject of study. The question is not, for example, whether a landlord and a tenant each receives the appropriate return for the resources he controls; but rather, is it appropriate, from the standpoint of the economic development of the country in question, for the landlord and the tenant to have these particular proportions of the nation's resources under his control? Such an approach would throw more attention upon the problems of the organization, and less upon the sheer operations, of national economies.

Conclusion

In conclusion, let me say that economic statesmanship is going to make hard-to-fill demands upon economists. Economists will affect future events, we hope for the good, in the degree that the theories out of which they build their analyses are relevant to *total* policy judgments. If, in the interest of simplicity, precision or nicety of argument, we draw abstractions which lead to erroneous policies, we shall not, and should not, be taken seriously. But this is not to say that we should abandon the so-called theoretical approach in economics. To the contrary, it is only through abstraction, through hypothecating, through theorizing that we can establish a basis for arranging raw data or facts into patterns of evidence meaningful in the solution of problems and in the analysis of policies. What is needed, if our work is to be relevant to economic development, is for economic theory to break through its shell of restraining assumptions which prohibit its functioning at the most needed point. Let economics not fall into empirical and theoretical camps; but let it, freed from overly restraining techniques, strive for theoretical penetration of *whatever* is *strategic* to the economic development of nations and the economic well being of man.

To the comment that this would lead us outside the legitimate content of economics, I should answer that economics may be defined only in terms of the services it is called upon by society to perform. The content of chemistry today does not fall within the original definition of its responsibilities—to turn lead into gold. And the scope of chemistry tomorrow will not fall within any definition that can be made of its scope today. To the comment that such an extension of economics would cause it to lose precision, I should answer, better to lose precision than to lose relevance. Astronomy is very useful to us and is cast in very precise appearing formulae; and yet it is happy to arrive at measures of distance correct within a few million light years. To the comment that it is very

difficult to get adequate data to verify the hypotheses necessary to extend economic theory into these more imponderable issues, because the experience of each nation differs from that of every other, I should agree. But I should point out that much of our knowledge about human nutrition is based upon the analogy between the rat and the human—knowledge which is not prevented by the differences, but made possible by the slender threads of similarities, between these very unlike creatures.

The new demands society is making upon it will push formal economics beyond its present horizons. But this does not mean that *individual* economists will have to cover more ground. All sciences move forward by utilizing a division of labor, especially at their growing points. This division of labor is made possible by the body of systematic theory which permits a scientist to move from his area of concentration to other relevant aspects of his science with speed and with precision. Thus should we hope gradually to extend economic theory, making these extensions meaningful by empirical investigations rigorously controlled by our theoretical postulates, to the end that economics may become truly relevant to problems of economic development.

DISCUSSION

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The basic orientation of Professor Long's comments is in agreement with my own thinking. Consequently, I shall elaborate on the four major points which he raised, rather than criticize the detail of his argument.

Professor Long does not deal directly with the functional relationship of the theories underlying his three conditions which make for economic development. However, for purposes of exposition, he divided these conditions into two broad theoretical categories common to us all.

1. Production economic theory

Condition a—An increase in aggregate resources

Condition b—An improvement in the state of productive arts resulting in the satisfaction of more human wants

2. Distribution theory

Condition c—An economic system which will increase the aggregate social utility

The foregoing classification does not set up discrete categories of action operating independently of each other. This is recognized, in part, by his defining resources and the state of the productive arts as essentially the same. We need consider only the relationship between the conditions dealing with "production economics" and those dealing with "distribution theory."

In considering this relationship, let us follow Professor Long's suggestion in regard to distribution theory and "throw more attention upon the problems of the organization, and less upon the sheer operations, of . . . economies." Thus, we will examine, among other things, the connection between technology, on the one hand, and the power relations among people, on the other hand. Within

this technology-power context, namely, the contest for the control of resources, many fundamental decisions are made. For example, the winner in this contest for control has much to do with the nature of the production functions employed in resource utilization. An illustration of this contest was the complex controversy for the control of the electric power production and the chemical production facilities at Muscle Shoals, Alabama. Following more than 10 years of indecision, Congress in 1933 vested the power to operate the Muscle Shoals chemical plants with the Tennessee Valley Authority. This Congressional act specified that the plants be used for fertilizer research and production. Further, the Congressional decision did much to shape TVA's activities with regard to fertilizer. In fact, the TVA Act goes into considerable detail in suggesting the type of interest to be taken in this respect. Naturally, we do not know what the consequences would have been had the contest gone differently; e.g., had the government accepted the Ford purchase offer in 1921. But, I think we can say with assurance that the operations of these properties would have been different if the contest had gone the other way.

The long-run concept of resources, as outlined by Professor Long, is important in sizing up the nature of development problems. He defines resources as "synonymous with the total of all the processes by which man adapts and creates his environment to suit his purposes, through the instrumentality of human knowledge—scientific and otherwise." Thus, as knowledge is developed and translated into effective action, our resource base changes. Elements of this idea are seen in the writings of others—for example, F. J. Turner, R. T. Ely, J. R. Commons, and Erich Zimmermann. Regardless of this heritage, the idea common to this group of men has been slow to work its way into our theory. However, this resource definition makes a potent concept in broadening the scope of policy considerations and permits an attack upon many new strategic issues.

Within the TVA, this instrumentalist view of resources has had rather wide acceptance. And, I should like to use part of TVA's experience to illustrate its policy effect. This resource idea is seen in TVA's emphasis on development rather than just conservation. In other words, the job was not one of just building a dam, buying the necessary property, and moving the families from the reservoir area. The job was one of consciously trying to change the "givens" in the situation. For example, one of the resources was the labor force working on the construction of the dams. To develop this labor, extensive employee training courses were undertaken to instruct them in new skills. However, employee training was only one of the many activities engaged in as a part of the construction process; e.g., providing family relocation services, initiating public health facilities, carrying out malaria control research, developing acceptable temporary housing structures, using site planning knowledge, stimulating recreational development, and other activities.

An additional requirement for putting this resource idea into action is the working out of institutional arrangements which will provide for the future development and utilization of the resource. In the process of solving its problems, TVA has included the stimulation of such institutional arrangements as part of the developmental job. Wherever possible, the policy desire has been to place these institutions directly in the control of the people of the area rather than with the TVA. Thus, with the creation of the chain of 28 lakes, a few individuals recognized a potential recreational resource. Consequently, TVA took an interest in recreational problems. Equally important to the creation of

the lakes, it stimulated the establishment of such organizations as state, county, and city park administration agencies, private development organizations, and a program of recreational research and education within the universities.

Professor Long repeatedly states he is talking about a long-run concept of resources. This phraseology should not mislead us into thinking that the resource idea presented can not be of service in dealing with some of our day-to-day difficulties. As we all know, the long run, as a period of time, is variable depending upon the problem under consideration. The important thing to remember is that we are working with problems of development. We are not attempting to establish an equilibrium among a set of static givens. For example, human knowledge, under favorable conditions, may bring a farmer into control of a specified management problem. And perhaps, it may better organize the entire farm within a period of say, five years. This has been done by reluctant farmers at the behest of insistent sons. For that farm family, resources have been expanded by such reorganization. In this reorganization process, one of the important tasks is assessing the future use values of alternative courses of action. Such considerations are crucial in suggesting new production processes to the farmer.

The logic of Professor Long gives considerable weight to the argument that his resource concept requires a modification of some current theory. However, some will hold that only a new set of givens is substituted into the old theoretical framework of making economic judgments. Therefore, I should like to call upon Professor Long to supplement this paper with an investigation of a particular problem of development—in say, a small watershed or any other situation where his theory will serve as a guide. This would give us a more detailed exposition of the required modifications of current theory, it would provide a partial test for his theory, and it would point up the particular situation where disagreements are apt to focus.

THEORIES CONCERNING LAND TENURE

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LAND tenure deals with the conditions under which people hold and occupy land. The core of its subject matter is the *behavior of people* with respect to land as property, as a source of income, as a place of residence and family life. Tenure conditions must be appraised according to how well they meet the needs of the people. Clearly, people visualize certain norms or goals toward which they strive, and want the tenure system to help them get these. Land tenure problems cannot be discussed without reference to some set of social values, some system of ideas concerning ethical norms in which people believe and toward which they orient their behavior. These social values are reflected in the institutions of a society and in the goals that individuals and groups pursue.

For instance, where the prevailing ideology stresses human rights, individual dignity, and equal opportunity for everyone regardless of color, creed, and wealth, farmers want tenure conditions to promote:

- (1) Managerial freedom of farmers to exercise their capacities and efforts to the benefit of their families;
- (2) Farm family incomes adequate to sustain acceptable standards of living;
- (3) Wide dispersion of land ownership among farmers, to safeguard managerial freedom, social status, and entrepreneurial opportunities for the many; and
- (4) Security of land occupancy.

To the extent that tenure conditions interfere with these goals, farmers are dissatisfied with them and, through individual and group action, press for their improvement.

Although farmers are numerically the largest group directly affected by tenure conditions, various smaller groups also are concerned and may want tenure conditions to serve different goals. For example, city investors and lenders may want tenure conditions that leave them free to buy and sell land without restrictions, to receive lucrative rents from their investment in land ownership, to exercise considerable control over the tenant's operations and occupancy, to secure effective means for collecting debt

¹The author acknowledges valuable criticism received from his colleagues in the Agricultural Economics Department of North Dakota Agricultural College, and especially from Baldur H. Kristjanson and Louis A. Fourn.

payments. Or large estate owners may want to keep their tenants poor and uneducated so as to keep them contented in their inferior status and safeguard the cultural, ruling, and entrepreneurial function of the landed gentry. Each group rationalizes its specific goals in terms of some ideology of social values or norms viewed as essential to the welfare of society.

Theories and Ideologies

The Italian writer and social philosopher, Ignazio Silone, says: "The distinction between theories and values is not sufficiently recognized, but it is fundamental. On a group of theories one can found a school; but on a group of values one can found a culture, a civilization, a new way of living together among men." As a social scientist, I do not belittle the role which theories and schools of thought play in the affairs of men. Yet I am inclined to agree with Silone's statement. During the last 150 years, the Western countries have in fact founded a culture, a new way of living, upon a new set of values, upon the belief in human rights and the dignity of the individual, in equality of opportunity for all.

It was the manifestations of this ideology which brought about general suffrage and representative democratic government. It brought about free public education, equality before the law, profound changes in the institution of property, and a whole gamut of social legislation strengthening the bargaining power, widening the opportunities, and improving the economic security of the poor. It abolished slavery and caste, peonage, and servitude. Latifundia were dissolved, landlords expropriated, and tenants made into owners. Free land was given to settlers, tenants were given rights of security and managerial freedom, land rents were placed under the control of courts.

All these changes—and there are many more—have one trait in common: they broaden the scope of life for the little fellow, the poor, the economically handicapped and vulnerable. Why? This shift in the distribution of power, social status, and income was envisaged in the humanitarian-democratic ideology as a prerequisite to human rights and dignity. It was implemented by representative government and the right of every citizen to vote. People and their leaders came to believe in this ideology, and acted upon it through the medium of the ballot box. And there just are more little fellows than big ones.

But what does this have to do with theories concerning land tenure? Theories in economics and other social sciences are always fitted into some sets of values. They are rooted in some ideology. Since to be relevant, economic theories must deal with human behavior, they cannot escape such entanglements with value judgments. People live by beliefs and act upon them. It is the economist's obligation to deal with them explicitly and objectively, as empirically observable facts. It is also his

obligation, however, to *detach himself from his own personal beliefs*, since it is not those he is studying.

Theories are systems of generalized propositions purporting to explain certain aspects of concrete phenomena. They provided a rationale for events and actions we observe empirically. They are indispensable for understanding the infinitely complex reality, for giving focus to our thought and inquiry, for predicting results of specific changes and consequences of specific actions. What, then, are the major theories that might help us to understand the essential issues in land tenure problems, and to evaluate alternative actions toward their solution?

I suggest that farm tenure problems in the United States can best be understood in the light of two major theories: the "*family farm theory of tenure*" and the "*farm business theory of tenure*." As we shall see, these two theories place different emphases upon various aspects of farm tenure, and lead to conflicting conclusions with respect to certain specific tenure conditions. Although both are rooted in the general ideology of humanitarian-democratic values, they differ in the ranking assigned to various sets of more specific beliefs.

Within my allotted time, I can do no more than sketch the highlights of these theories in bold strokes. Please forgive the many oversimplifications for which I must plead guilty under these circumstances.

Family Farm Theory of Tenure

This theory consists of the following general propositions. The welfare of the nation and of the rural community is best served if:

- (1) Farmers own and operate their farms as independent entrepreneurs;
- (2) Farm units are large enough to yield farm families an acceptable standard of living;
- (3) Farm units are not larger than the farmer and his family can operate without depending upon a substantial year-round hired labor force, so as to provide a wide dispersion of land ownership among farmers;
- (4) Farm families are secure in the occupancy of their land.

From these general propositions, a series of more specific sub-propositions are derived. To achieve these norms of a desirable farm tenure system, it is necessary, according to this theory, that:

(1a) Appropriate credit is made available to qualified farmers so that they can become owners of adequate-size farm units;

(1b) Tenancy is a temporary phase, as a young farmer climbs the agricultural ladder to ownership and a retiring farmer passes the farm on to the next generation;

(2a) Farmers on inadequate units can secure credit to enlarge their enterprises, vertically and/or horizontally, to an adequate size;

(2b) Tenants are not charged rents so high, and are not so restricted in their managerial freedom, that they cannot make an acceptable living for their families and accumulate savings toward land ownership;

(3a) Farmers are discouraged from owning or managing acreages much larger than they can handle without considerable year-round hired labor;

(4a) Farmers are not dispossessed through foreclosure if their default in debt payment is caused by external hazards beyond their control, and not by mismanagement or ill-will;

(4b) Tenants have long-term leases or ample notification for lease termination, with provisions for compensation for unexhausted improvements they have made.

This, in brief, is the theory underlying much of federal and state legislation directly affecting tenure, from the preemption laws and the Homestead policies of the 19th century to the Federal Land Banks, Frazier-Lemke Act and state foreclosure moratoria, state anti-corporation laws, Farm Security and Farmers Home Administrations, and the acreage limitation of the Reclamation Acts of the 20th century. This theory, in large part, explains the formulation of such policies and offers guidance for the solution of practical problems arising from their application.

The social beliefs or value judgments in which this theory is rooted are those associated with Thomas Jefferson's philosophy of the peculiar characteristics of a rural family farm economy. Jefferson wrote: "Those who labor in the earth are the chosen people of God, if ever He had a chosen people, whose breasts He has made His peculiar deposit for substantial and genuine virtue." And again, "Cultivators of the earth are the most valuable citizens. . . . They are . . . tied to their country, and wedded to its liberty and interests, by the most lasting bonds."

In a modern, industrialized society, Jefferson's eulogies sound a bit extravagant. No single group today should claim to form the bulwark of democracy and be the sole repository of all admirable human and social virtues. A. Whitney Griswold, president of Yale University, demonstrated in his book, *Farming and Democracy*, that democracy can thrive without a preponderance of family farms in the economy. But his study also suggests that whatever the size of the agrarian sector may be, the environment of a family farm community is more conducive to democratic processes than that of large estates.

To present-day proponents of a family farm tenure system, this latter point is sufficient to justify a family farm policy on socio-political grounds. Family farmers are self-employed proprietors not subject to being hired and fired, and develop entrepreneurship with its attendant qualities of self-discipline, responsibility, and self-assurance. They are craftsmen with a close personal relation to their work, which is variegated and requires every day a series of managerial and technical decisions,

adapting the various tasks to the weather, seasons, and growth processes of plants and animals, and to price and market conditions. Family farm communities are spared the tensions and class conflicts that separation of management and labor has brought to so many industrial communities. The theory in modern terms is that, for these and related reasons, family farm tenure conditions are more conducive to democratic ways of life than are tenancy and large-estate tenure conditions.

Farm Business Theory of Tenure

This theory consists of the following general propositions. The welfare of the nation is best served if:

- (1) The business of farming is conducted along the financial, organizational, and managerial principles applied in any other non-farm business;
- (2) The free market forces are allowed to determine the tenure status, size of farm, and family income for each farmer, agricultural worker, or employer according to his individual ability to take advantage of the market;
- (3) Farmers are not accorded any legislative protection and aid that are not given other producers elsewhere in the economy.

Here, let us recognize the first essential difference between the two theories. Clearly, the farm business theory emphasizes the production efficiency aspect of economic welfare; the family farm theory stresses the distributive equity, social status, and security aspects of community welfare.

From these general propositions, a series of more specific sub-propositions are derived. According to the farm business theory, the norms for a desirable farm tenure system require that:

- (1a) Free scope to superior management is given to farmers and any other business executives in organizing agricultural resources in efficient production processes;
- (1b) Investors furnish credit and equity financing (in land ownership) to agriculture under the same conditions as to comparable non-farm enterprises;
- (1c) Separation of management and labor and the principles of specialization and labor division are applied wherever profitable, as it has been done in industry;
- (2a) The proportion of owner-operator, tenant, and large-scale manager-operated or large-estate farms, as well as the proportion of small, medium, and large farms, is left to whatever emerges from the workings of the competitive market forces;
- (2b) Financial resources, managerial and technical supervision by landlords or their professional agents are made available to tenants;
- (2c) Tenants are charged reasonable rents and granted sufficient security of occupancy so as to sustain their interest in efficient production;

(3a) No restrictions are placed upon employers as to the number of workers they can hire or the acreage they can control;

3b) No special debt relief measures are granted to farmer borrowers, and no government funds for credit or other financial aid are made available.

This, in brief, is the theory growing out of the prevailing beliefs of the business community and of some agricultural economists. It also is the theory which underlies much of the criticism of public programs developed on behalf of farmers.

Perhaps the majority of economists, businessmen, farmers, and other groups do not hold to either theory in its pure form as here outlined. Some of the family farm school admit that too close adherence to the norms might involve degrees and kinds of government interference with the market, such as graduated land taxes or prohibition of land ownership by non-farmers, which may have bad repercussions. Some of the farm business school agree that the free market forces do not always and in all places promote general welfare, and that certain public farm tenure programs, such as the Federal Land Banks or the Farmers Home Administration, have a constructive role to play. Still, it is useful to think through the implications of these two theories in a rigorously logical fashion.²

Social beliefs in which the farm business theory is rooted are those of a laissez-faire philosophy. The market mechanism, "free" from government interference, the "law of supply and demand," is conceived as a natural order working for the benefit of mankind. Proponents of this theory believe that the natural market order assigns to each individual his rightful place, according to his gifts and efforts, and thus maximizes the welfare of society as a whole. Most modern welfare economists modify their position only to the extent that government interference with the market makes some people better off without making anyone worse off. With any given set of institutional arrangements, the scope of government functions within the limitations of this welfare criterion is of necessity very narrow, especially in short-run perspective.³

In modern industrialized society, these social beliefs have become tempered by an increasing awareness on the part of people of the many "imperfections" of the natural market order. Still, this theory explains

²It also should be pointed out that the farm business theory of tenure is not really a tenure theory, as it does not contain any basic tenure norms in its central propositions. All it says about tenure is that tenurial arrangements must not interfere with the optimum allocation of resources as determined by a free market mechanism which maximizes production and hence economic welfare.

³In addition, many economists recognize serious market "imperfections" (?) or obviously inequitable (?) initial institutional conditions as justification for government interference. Still, the free market mechanism, given equitable (?) initial institutions and positions of the various groups in the economy, is usually believed to maximize production and economic welfare. (The parenthetical question marks indicate the terms involving social value judgments).

much regarding existing tenure conditions, and offers guidance for the solution of practical problems arising from these market imperfections. These solutions usually take the form of education and organized advice of business and professionally trained personnel to farmers, especially young tenants. One of the most recent ways by which this theory of farm business tenure is being applied is the establishment and expansion of professional farm management services for absentee landlords. Historically, its most important application has been in offering opposition to most farm programs intended to strengthen the family farm, from the Homestead Acts to the Farmers Home Administration.

Critique and Synthesis

A scientist regards any theoretical proposition as a hypothesis constantly subject to test for verification, modification, or abandonment. But the ideologies out of which theories are conceived are not amenable to such empirical testing. They are believed or disbelieved. A theory can only be tested in terms of its own conceptual structure.

For instance, the farm business tenure theory is based upon the belief that economic welfare requires maximum production, and posits that free market forces lead to maximum production. Then, the proposition that desirable tenure conditions require the proportion of owner-operators, tenants, and managers to be left to competitive market forces can be tested only in terms of whether the actual concrete tenure pattern resulting from the workings of the market does, in fact, maximize production. Suppose tenure conditions are found which depress production. If they are traced to market imperfections, the validity of the proposition is not challenged; the remedy lies in removing these market imperfections. If, however, output-depressing tenure conditions are found to be the outcome of competitive market forces, the proposition is invalidated. It would mean that there are conditions where the free market does not lead to maximum production, and that a substitute proposition must be formulated to interfere with market forces sufficiently to provide for tenure conditions facilitating maximum production. Still, the basic belief that welfare requires maximum productive efficiency remains unscathed by such findings.

Beliefs cannot be verified objectively. The task of the social scientist is to observe objectively what beliefs are held by what groups, and to what theories they give rise. The empirical outcome of the struggle between conflicting beliefs is determined primarily by the socio-political order of society, by the relative power positions of the respective groups. Whether actual events in American agriculture will move in the direction of the family farm or the farm business tenure theory will depend largely upon

the relative power of the two groups holding these conflicting beliefs, in the formulation of public policy affecting tenure.

Let us briefly appraise both theories of tenure in the light of these considerations.

First, as to basic beliefs. The family farm theory rests upon the belief that distributive equity (including opportunity, status, and security) is the dominant aspect of a nation's welfare, while the farm business theory assigns the dominant place to production efficiency. What groups typically hold these beliefs? On the whole, hired workers, small and medium-size farmers throughout the economy rank distributive equity highest in importance. Their bargaining position in the market is comparatively weak, and they consider the recurrent threats of overproduction and unemployment as a result of maldistribution of income and economic power, rather than of inefficient production and their own individual failings in thrift and efficiency. Hence, their faith in the justice meted out by the market mechanism is not adamant.

In contrast, business executives, employers, and production technicians tend to rank production efficiency highest; they consider overproduction and unemployment as a result of market imperfections, often due to government interference. Their bargaining power in the market is comparatively strong, and their faith in the justice of the market system, in general at least, has stood them in good stead.

Second, as to the production implications. We can touch only upon a few highlights. The family farm theory holds that a wide *dispersion of entrepreneurial opportunities and land ownership* among many farmers is more important to community welfare than whatever improvement in production efficiency might be achieved by concentrating entrepreneurship in the hands of fewer people and thereby relegating many farm families to the comparatively routine functions of supervised tenants and farm laborers. This means that even if it can be proven that concentration of management and ownership in fact increases agricultural production efficiency, the family farm theory is not invalidated by such proof. Distributive equity, opportunity, status and security, rather than maximum production, are the social values upon which the theory is based.

Incidentally, there is no conclusive evidence that management-labor separation and large-scale industrial organization of agricultural production processes would yield a superior production performance in the aggregate which could not be achieved under family farm tenure conditions, except perhaps in a few highly specialized types of farming.

The farm business theory holds that if it were not for market imperfections and public policies keeping small inefficient family farms going, the

same agricultural output could be produced by a much smaller farm labor force. And the thus released under-employed farmers would find non-farm employment where their labor would be used more productively. Everyone, so the theory goes, would be better off. This means that even if it can be proven that such a substantial reduction in the farm labor force and the number of farms results in loss of social status, entrepreneurial opportunities, and security for the displaced farm families, and in class conflicts and employer-employee friction in rural communities, the farm business theory is not invalidated by such proof. Maximum production efficiency, rather than distributive equity, is the social value upon which the theory is based.

If dissatisfaction with the result of such workings of the free market forces should develop to a point where many people shift the ranking of their beliefs from the supremacy of production efficiency to that of distributive equity, the farm business theory would be discarded, not because it is wrong, but because the prevailing social beliefs have changed.

Finally, as to the synthesis of complementary and compatible elements of both theories. There are wide areas of practical tenure problems where solutions can be found that fit into both theories. For instance, increasing the resources of under-size farm units into larger, more efficient family farms meets the requirements of both tenure theories, even if this reduces the number of farms. The family farm theory does not call for the largest possible number of farmers regardless of their living levels, but provides for some efficiency criteria in the proposition that family farms must be large enough to yield the family an acceptable living. The farm business theory does not call exclusively for large-scale factories in the field or concentration of management in professional agencies, but posits only that resources should be used as efficiently as possible. As family farmers become more efficient producers, their tenure status is compatible with the farm business tenure theory.

Or take another example. Both theories stress entrepreneurship, one because of its effect upon personality development and social attitudes, the other because of its effect upon production efficiency. Any improvements in tenure conditions which promote the managerial scope and performance of family farmers follows the general propositions of both theories.

Perhaps the most important factor that tends to reduce the conflict of the two theories in practical application is that the biological and spatial nature of agriculture places rather formidable obstacles to labor division and managerial concentration. The hopes of businessmen and economists for a sweeping revolution of the agricultural tenure system and production organization in the image of industry were much more sanguine in

the '20's than in the '50's. I sense a growing realization among agricultural economists of the limitations to economies of scale that set in as the size increases beyond a two- or three-man farm, at least in the general crop and livestock types of farming areas. This indicates that potential efficiency gains from larger-than-family-size units, from management in professional agencies supervising a large number of tenants, may not be significantly greater than those attainable within the framework of a full-fledged family farm tenure system.

Land Reforms Abroad

So far, I have drawn upon land tenure problems and experiences of the United States. In many countries of Asia and the Middle East, and even in some South European areas, land tenure problems are at present of much more crucial importance than in the United States. Drastic land reforms are in the offing in vast regions of the world. Theories concerning land tenure along the lines I have sketched out here are most relevant there.

In many of the industrially underdeveloped countries, large estates are owned by a small group of well-educated people whose historical function it has been to control the economy and to govern the country. Social beliefs relevant to tenure conditions have been that the well-to-do landowners are in the best position to exercise managerial functions and to determine governmental policy in the nation's interest. Out of these beliefs grew a "landed estate theory of tenure" according to which the landowners know best what is good for their tenants and farm workers, furnish them land, capital and supervision, and in return receive whatever remains after the subsistence needs of the farm families have been met. Note: The issue is one of distributive equity and status, not of production efficiency.

In recent years, these social beliefs have lost ground in the minds of more and more people. Communist propaganda, as well as contact with Western democratic ways of life, are undermining the farmer's faith in the beneficence of the elite of landowners. The result is agrarian unrest and clamor for land reforms. The landed estate theory is challenged, not because it is *wrong* as a theory, but because the social values in which it is rooted are no longer held by groups that are ascending in political power.

Recognizing fully the danger of ethnocentric reasoning, I submit that the social beliefs underlying the four general propositions of the family farm tenure theory are surging over the peasantry of the Eastern world. Specific formulation of these propositions would vary widely according to an almost infinite array of local institutions, customs, attitudes, and immediate aspirations of people.

The World Conference on Land Tenure held last fall at the University of Wisconsin impressed me with the apparent universality of the basic social beliefs that are pressing for recognition in the formulation of land reform programs: the beliefs in the dignity of the individual; in a wider scope for his economic, entrepreneurial, and educational opportunities; in greater security; and better living.

In most cases, changes contemplated to serve these basic goals generally point to dispersion of land ownership and managerial functions among farmers, to expropriation of landlords or restricting their control, to reducing rents and increasing security on the land. Where independent small farm units appear economically unfeasible, the alternative usually runs to cooperative arrangements rather than to large estate or plantation systems of tenure, at least in the non-Communist countries. Everyone recognizes the need for increased farm production, but people do not believe a free market will accomplish it. Increases in production efficiency can be achieved under many different tenure systems. The issue in land tenure reform is distribution of income, social status and power, not maximum production.

Land reforms are willed by people, are sanctioned and enforced by governmental process, and run counter to whatever market arrangements prevail in the respective area. On the other hand, chances are that after a land reform has been successfully accomplished, the market mechanism, if it is appropriately adjusted to meet the needs of the many rather than the few, will operate within a different institutional framework in such a way as to benefit the country more than it did before, by facilitating more equitable income distribution as well as greater production efficiency.

There is desperate want of theoretical thought in land tenure at home and abroad. I suggest that the relevant theories for shedding light on the crucial tenure problems of our time must be found in the field of social theories. These theories must deal with human behavior, motivations, and group action; and treat institutions explicitly as variables. And this, the well-known theories labeled so ambiguously "Value and Distribution"—the classical equilibrium theories of prices, of rent and land value, interest and wages—fail to do. Their contributions to the understanding and solution of land tenure problems, though substantial for certain specific aspects, lie toward the periphery of land tenure issues.

DISCUSSION

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Professor Schickele, with whom I often disagree on public policy issues, has presented an exceptionally thoughtful discussion of this subject. Indeed, within the time limitations imposed upon him, Schickele has done about as well with

his assignment as any fair-minded critic could ask. I don't know whether this means that I have convinced him, or that he has weakened me.

It is unfortunate that the points of view expressed in both of the main papers in this group meeting are not also represented in the two general sessions on agricultural policy. Schickele's emphasis upon the *behavior of people*, upon social inquiry and upon the wholeness of intellect which the times demand of agricultural economists—it is such observations as these which need to be impressed upon our profession again and again. The occupational habit of abstracting man from his environment, from his emotions and his varied group relationships, and thus reducing his behavior to mechanistic formulae, is no longer merely unrealistic. Its practice in a world astir with revolution is potentially dangerous. Schickele's paper demonstrates a way to avoid this shopworn analytical technique without loss of economic logic or content.

We have heard a cataloguing of the goals of land tenure in the United States, a clarification of the fundamental differences between theories and ideologies, and a review of the conflict between this nation's family farm objective and "efficiency" or the sacred function of the market place. A final section was devoted to the crucial issue of land reform in foreign countries and its relationship to our own tenure policies. With this treatment I can find no serious fault. Even the definition of family farm, an invariably controversial topic, is set forth in general but entirely acceptable terms.

Schickele recognizes that a body of theory is modified by the emergence of new problems and the alteration of old problems. Without attempting to identify the starting point of the process, he notes that revisions in a set of values are soon followed by revisions in the related body of theory. Obviously, then, value systems are adjusted in relation to changes in economic, social and political conditions. The abolition of feudalism in the Western nations in favor of an ideology based on freedom is a particularly timely example, in view of current developments in many regions in the East.

One might reasonably wish that Schickele had pursued this analysis still further. Research programs in land tenure seem to be suffering from a cultural lag at the moment. The vitality and usefulness of our theory depends, not only upon major adjustments in beliefs, but upon essential shifts in emphasis through time as the relative urgency of different tenure problems varies. I submit that we are failing to redirect our efforts right now toward the most significant contemporary problems.

This failure can be demonstrated by reference to the goal of promoting "access to land on the part of young farmers and of farmers on inadequate holdings." To facilitate the orderly transfer of land resources and management responsibilities from one generation to the next is a laudable service which has occupied the interests of many sincere and able men attending this meeting. But sometimes I think that there should be an allotment program on publications dealing with father-son arrangements, preceded perhaps by a plowing under of every third such bulletin already published.

While father-son studies involve a problem of considerable importance, a companion problem has come to overshadow it almost completely. I refer to the nearly insuperable difficulties of capital accumulation that confront the young man whose father or father-in-law cannot provide the momentum in the form of capital gifts, inheritance or loans. We have had so little experience with prolonged inflation that we are slow in gauging the relative urgency of these two related, though distinctly different, problems.

A study in Texas shows that between 1942 and 1950 some 90 per cent of a

group of young farmers who stayed in business, and achieved measurable progress, owed their success either to having been well born or artfully wed. In other words, those who were not identified with land-holding families—regardless of their personal qualifications—were unable to attain the security of occupancy necessary to survive and move ahead in the business of farming. As investment costs continue to mount, opportunity for the traditional climb up the tenure ladder continues to diminish.

The concept of a tenure ladder has long had an honored place in our value system. Its destruction cannot be reconciled with the beliefs or theories of economic sense presented here today. To attack the problem analytically does not call for a revamping of the discipline of agricultural economics. It does call for recognition of the problem and its relative urgency, a shift in research emphasis, and the steady application of scientific skills of the sort that inevitably leads to solutions.

CRITICAL REVIEW OF U. S. WATER POLICY

Chairman: Roy E. Huffman, Montana State College

WATER POLICY ON RANGE AND FOREST LANDS

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ONE of the essential functions of range and forest lands is to safeguard watersheds and their dependent water supplies.

High mountain ranges, largely in national forests, contribute most of the run-off but little of the sediment of Western streams. Lower ranges and foothills, largely in grazing districts, contribute little run-off but most of the sediment. The condition of plant cover on these lands, through watershed influence, is vital to the water economy of the West.

Watersheds Are Natural Units of River Basins

The President's Water Resources Policy Commission viewed watersheds as the "natural units of river basins," and recommended a nine-point policy of watershed management.

The Commission recommended, first, that soil and forest conservation occupy a place of major importance in river basin programs and that watershed management be accelerated in line with water storage and use. This essentially is a question of achieving a reasonable balance in the allocation of capital resources to the various segments of the natural resources program.

The lag in investments for soil, range, and forest conservation arises primarily from the fragmented manner in which the various components of natural resources programs are investigated, planned, evaluated, and financed. Individual activities frequently are speeded up or held back by strong support or opposition from special interests. Unity is lacking in the over-all program.

The forest and range components are oriented more nearly nationally than regionally. This is also true of the surveys, research, and investigations upon which forest and range activities must be based. This has not meshed well with the individual project orientation of water storage and use projects. The renewable resources investment program and the budget procedure recommended by the Commission would go far toward correcting this discrepancy.

Second, the Commission stated that federal farm and water resources policies should support rather than conflict with conservation.

* The views expressed are not necessarily those of the Bureau of Land Management.

Serious maladjustments between water resource developments and land resources have occurred or may occur. Certain water storage projects such as Hungry Horse, in Montana, have interfered seriously with access routes to forest lands.

A related problem is that of nature conservation. The Department of the Interior has recommended that national parks, monuments, or other areas of national significance be reserved from water project development, except when clearly required by a superior national interest.

Third, the Commission recommended that the work of watershed management agencies be coordinated into a single program for each basin and for the country as a whole.

Major problems of coordination exist on public lands and with private lands. Intermingled location and other factors of use require coordination.

The advisory board system under the Taylor Grazing Act has done much to integrate the management of public lands with private lands in grazing districts.

The state soil conservation districts may provide a partial key to coordination. Cooperative agreements between federal agencies and with state agencies are widely used in the field.

The inter-agency river basin committees aid cooperation. However, cooperation does not in itself assure coordination.

Recognizing the need for government reorganization, the Department of the Interior has recommended that federal responsibilities for the management of natural resources be made the mission of a Department of Natural Resources.

Fourth, the Commission recommended that techniques be developed to measure the accomplishments of watershed management and estimate the size of job.

Lack Data on Forest and Range Lands

Research and basic data for forest and range lands are far behind the needs for action. The programs of topographic, geologic, cadastral, soil, forest, range, and other related surveys should be rapidly accelerated.

Recognizing that economic measurements of range land projects are particularly deficient, the Western Agricultural Economics Research Council, cooperating with the Farm Foundation, is sponsoring a regional program of research on the economics of range land development.

Although basic data are limited, the size of the job ahead nevertheless has been estimated. USDA has made regional size-of-job estimates for the Missouri Basin, and others are in preparation.

In 1951, the Department of the Interior recommended legislation that would authorize a 20-year program of forest and range rehabilitation on Interior-managed lands at a cost of 168 million dollars.

An urgent need is to develop acceptable and consistent formulas to measure the economic justification and financial feasibility of projects. We need to depart from formulas that are weighted toward certain classes of resources or types of construction.

Fifth, the Commission recommended that federal lands should be managed more effectively to improve forest and forage growth and minimize erosion; that grazing be excluded where precipitation supports inadequate vegetation; and that stock numbers be adjusted to the carrying capacity of the range.

In the main, watershed protection may be achieved by curtailing improper use of the resources on watershed lands. In only limited cases is it necessary to forego the reasonable use of resources. Fortunately, the productivity of most watershed lands can be substantially increased.

The carrying capacity of lands in grazing districts can be raised 30 per cent by brush removal, reseeding, water spreading, and other measures. The benefit-cost ratios of this work appear favorable.

Unfortunately, the rate of timber harvest from federal lands is much below the sustained-yield capacity of those lands, due primarily to inadequate access roads, inventory data, and timber sales personnel. This waste tends to cause additional exploitation of private forests.

Sixth, the Commission recommended that the federal mining laws be revised to provide development of the non-mineral resources on mining claims. The Commission was preceded in this line of thought by the Hoover Commission, and has now been followed by the Materials Policy Commission, which has reemphasized that revision is needed to stimulate mineral discovery and production.

Increase Funds for Watershed Management

Seventh, the Commission recommended that the expenditures for watershed management be increased in line with expanded water developments and that conservation practices be enforced on private lands where necessary.

The federal land managing agencies have submitted or are in the process of preparing accelerated programs for most basins.

Federal investment in range development of private lands is at a higher rate than investment in development of public lands. PMA payments to ranchers, aggregating four to five million dollars yearly, have gone far toward stimulating needed work. By contrast, the policy on public lands has been to require that private capital aid in construction and assume a major share of maintenance.

Water developments on range lands assist in conservation by promoting better distribution of livestock on the range.

In grazing districts, authority to construct water developments and

other range improvements is given to range users through construction permits. Outside of districts provision is also made for the private development of stock water facilities.

Forest and range land owners have an obligation wherever feasible to practice the kind of management that will maintain natural resources. Where this is not or cannot be done, public authority has been or may be interposed. In the watershed segment of water policy, however, we must face the fact that for important aspects the public agencies will not be in a position to tell landowners what to do, but will be in a position of exercising leadership and persuasion.

Eighth, the Commission recommended the public acquisition of areas not suited to private conservation and use.

Among the types of land which should be considered for acquisition are key tracts that form barriers to orderly stock movements, that contain watering places located for driveway use, that require intensive watershed protection, or that interfere with the use or conservation of adjoining public lands.

There is at present no authority for acquisition of lands in grazing districts except by gift or exchange. One suggestion has been that funds received from the sale of public lands be made available, upon appropriation, to acquire needed lands.

Ninth, and last, the Commission recommended that ways be found to increase the participation of operators and the public in watershed management.

Cooperation has been extensively obtained along some lines, such as forest fire prevention. Public consciousness of other aspects, such as range fire prevention, is not nearly as advanced.

National policy provides federal financial and other aid to owners and operators. Even with this aid, however, the individual interest of the owner or operator is not always enough to insure minimum conservation.

In conclusion, it may be pointed out that water policy objectives, though highly important, should not necessarily control the use and management of forest and range lands. High in importance also are objectives of forage and timber production. Wildlife, recreation, nature protection, minerals, and other related objectives cannot be overlooked. A fully comprehensive viewpoint is essential in a multiple-use policy of conservation and development.

IRRIGATION POLICY FOR ARID LANDS

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IRRIGATION policy for arid lands as a part of an over-all water policy has been the subject of much attention during recent years. The Hoover Commission wrote 1280 pages on the subject; the President's Water Resources Policy Commission followed with its three-volume report; the Missouri Basin Commission is the most recent. In addition to these formalized groups, there has been much attention given to the subject by the Budget Bureau, by subcommittees of the Federal Inter-Agency Reservoir Basin Committee (FIARBC) and by many private or semi-private groups.

Probably the recommendation of the President's Water Resources Policy Commission came nearer to being considered by Congress than those of the other groups. As a result of this report, proposed legislation entitled "The Water Act of 1951" was drafted. After being reviewed by the various agencies, the draft of the legislation was returned to the Budget Bureau for simplification and clarification. After being simplified and clarified, the act had been increased from about 60 to 120 pages. Even then it was not considered to be in suitable form for presentation to Congress. It is difficult to predict what may happen in the future on the proposal. Action on recommendations of other groups is not promising.

The above review suggests that something is seriously wrong with current water, including irrigation, policy. The simple facts are that we do not have an effective irrigation policy that meets current needs.

Federal irrigation policy began with the passage of the Desert Lands Acts in 1877 and 1891. These acts quickly gave way to the Carey Act of 1894, which, in turn, was superseded by the Reclamation Act of 1902. This Act, as modified from time to time, represents the charter under which most of the recent federal irrigation development has occurred.

The Present Reclamation Law

The present reclamation law incorporates the following policy provisions:

(1) Acreage limitation, (2) interest-free financing, (3) anti-speculation, (4) repayment in 40 years, or (5) water-service type contracts which may each run as long as 40 years, (6) annual charges based on ability to pay, (7) financial assistance from power, (8) recognition of multiple-

* The author accepts full responsibility for the ideas presented herein. They are not necessarily those of the Department of the Interior.

purpose concept of projects, and (9) repayment contracts prior to water service.

In addition to the above policies, incorporated in law, the Bureau of Reclamation has adopted the administrative policy requiring the use of benefit-cost ratios for project justification. Obviously, the legal and administrative policy of an organization that has been in existence for 50 years is more extensive than I have noted. But the items listed are those which are pertinent to the thesis I propose to develop.

The pioneers in the field of irrigation developed the projects which were easiest, and, consequently, cheapest to construct. As time has elapsed and "know how" has increased, more complicated projects have been undertaken and are being proposed. It is, however, becoming more and more difficult to show a favorable benefit-cost ratio (justification) and payout (feasibility) under terms of existing law and departmental policy. It is now very difficult to secure the authorization of a new project. Of the several authorization bills that were introduced during the last session of Congress, only two received favorable action. One of these was aimed at establishing a framework under which certain projects could be reported on. That bill, in effect, established a new policy for a limited area. The other bill passed was in connection with a previous authorization.

As a concrete example of the application of the existing policy, I should like to review briefly some facts relating to the Columbia Basin Project. The project was originally justified and undertaken under the National Industrial Recovery Act. In fact, over \$30,000,000 was spent on the project before it was separately considered by the Congress. Following separate authorization, an allocation report was prepared. That report allocated costs to irrigation, power production, downstream regulation, and navigation. It provided for the use of power revenues to help pay the irrigation allocation. Under current plans and estimates water users will repay about 18 per cent of the construction cost allocated to irrigation. The balance of the irrigation allocation will be repaid through power revenues. In addition, a block of power was reserved for irrigation, to be sold at a special rate, based upon cost of generation.

Various bills have been introduced recently in Congress which would expand the concept of financial assistance to entire basins. If such bills were approved, financial assistance from power would become available whether power production was directly associated with the project. Also, there have been proposals to broaden the concept of multiple-purpose projects and recognize more functions on a non-reimbursable basis. Obviously, the purpose of these proposals is to remove existing blocks so that irrigation development can move ahead. If these changes were made, and assuming Congress would authorize the undertakings, in some basins

irrigation benefits would become the criteria that would determine the extent and rate of irrigation development.

Several years ago I believed that agreements on basic policies and procedures, particularly repayment and benefits, could be reached and incorporated into law. At the moment I am less optimistic. Agreement must first be reached on the objectives of the irrigation program. There are now apparently great differences of opinion regarding the objectives. The individuals involved in the modification of irrigation policy have certainly not agreed upon them. The fact that there is a difference in assumed basic objectives has not occurred to the individuals concerned, and so the objectives themselves have not been laid open for critical examination. Thus, since the interests concerned have unconsciously disagreed on objectives, it has been impossible to reach agreement on policy.

The fact that I raise the question regarding the objectives of irrigation may appear incredulous, but I would like to illustrate the point. The Reclamation Act of 1902 states the purpose of the act as "development of water for the reclamation of the arid and semiarid lands. . . ." Speaking before the National Irrigation Congress in 1905, F. H. Newell, first head of the Reclamation Service, said: "The object . . . is not so much to irrigate the land as to make homes. . . ."

There is ample evidence in the record that around the turn of the century the Reclamation Act was looked upon as a combination of conservation, home development, and economic development program. For these reasons the policies already noted were incorporated into law. In terms of such objectives, acreage limitation, interest-free financing, long repayment periods, financial assistance from power, the adjustment of annual payments on the basis of repayment ability, and other provisions of the current law are perfectly consistent and reasonable.

A look at Western history will indicate that irrigation development has contributed toward the attainment of these objectives. Irrigation has welded the West together; it has made homes, towns, and cities; it has made the Western states significant members of the family of states.

Many people, either consciously or unconsciously, still hold to these early enunciated objectives. Just recently I read a letter which stated, "The creation of new and improved farming opportunities is the major objective of reclamation." It is my personal opinion that the Department of Interior still holds to these original objectives.

Nowhere in the original act was it indicated that the purpose of irrigation was to produce food. Food production was presumably a by-product, a means of accomplishing the major objective. The initial primary objective was the basic reason for putting the Reclamation Service in the Department of the Interior rather than in the Department of Agriculture. It was not viewed at that time as an agricultural program.

Purpose of Irrigation Is Food Production

In spite of the fact that food production was originally viewed only as an incidental objective of the irrigation program, irrigation policy is now traditionally approached within the framework of a food program. The President's Water Resource Policy Commission apparently assumed food as the objective. At no place in their report do I remember seeing a discussion of the objectives of irrigation. The Committee assumed food as the primary objective, and immediately became involved in population trends, adequate diets, total cropland, trends in production efficiency, use of fertilizer, etc. Even so, however, it should be recognized that the Committee did propose a federal contribution in recognition of the indirect benefits.

The FIARBC Sub-committee on Benefits and Costs assumed food as the objective and became involved in alternative opportunity, unused processing capacity, etc. The Budget Bureau assumes food as the objective and asks the Department of the Interior if the Department of Agriculture has approved the agricultural feasibility of this or that report. Many specialists and technicians, especially those in the Department of Agriculture, consider food as the main objective. A paper recently prepared by a Department of Agriculture employee indicated that the justification for the irrigation program rested largely upon the need for food and concluded that future investments in irrigation should be carefully considered against alternative methods of producing food. This expression is typical of those found in many places.

If the production of food is the major objective of the irrigation program, then it would appear logical to apply policy provisions that have been developed for agriculture. Such policy provisions might involve:

- (1) Repayment, with interest, in a period of years comparable to that provided for other types of agricultural credit;
- (2) the elimination of size of farm controls;
- (3) the elimination of financial assistance from power or other sources to irrigation;
- (4) treatment of other functions of multiple-purpose projects in a manner consistent with irrigation, and
- (5) the elimination of benefit-cost ratios.

If, on the other hand, the objective of the irrigation program is to settle the arid lands of the West and further the economic development of the nation, the policy implications are clear. They would include:

- (1) The liberalization of existing policy with respect to repayment requirements,
- (2) the elimination of alternative opportunity or cost in the consideration of benefits,
- (3) repayment would become a secondary consideration,
- (4) acreage limitation would be continued, and
- (5) anti-speculation would be continued.

It is, therefore, apparent that an irrigation policy based upon the

objective of economic development and settlement of the West would be completely different than a policy based upon the objective of food production.

Summary

Actually, several objectives might be ascribed to the irrigation program and they would vary in relative importance from time to time. Some of the most common are:

(1) Conservation and development of arid lands, (2) settlement of the West, (3) provision of settlement opportunity, (4) provision of work opportunity during periods of depression, (5) creation of a market for products manufactured in the East, (6) production of specialized agricultural products, particularly during periods of emergency and shortages.

These varied and changing objectives certainly complicate the development of an irrigation policy and they inevitably result in certain inconsistencies in that policy.

In summary, irrigation policy must be developed in recognition of the basic objectives of the irrigation program. Objectives are numerous and, since they vary from time to time, early agreement on policy cannot be expected. In the meantime, the irrigation program will go slowly ahead on a piece-meal basis. The Budget Bureau will continue its present practice of critically reviewing each proposal to be sure undesirable precedents are not established. Congress will continue to consider all ramifications of policy in connection with each proposal rather than disposing of such policy questions in a single package of basic legislation.

WATER POLICY IN HUMID AREAS

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University of Wisconsin

A WATER Policy for American People" should be supplemented if we are to deal adequately with water policy questions in humid areas. The main issue can be developed and briefly stated in a few sentences. (1) Water has recently become a scarce resource in humid areas; (2) It will become progressively more scarce; (3) The market mechanism has not been effective in allocating water resources in the past and probably will not in the future; (4) Present rules for allocating water in humid areas are not adequate; (5) We must work out rules in humid areas which allocate water economically and at the same time give the individual some security of expectations and opportunity to exercise his initiative.

Basic difference between water in humid areas and water in other areas is that the water in humid areas until recently has been sufficient to meet the needs of water users.

Basic Water Rules of Humid Areas

Unlike the West, the humid areas have not been confronted with the problem of rationing water either by pricing arrangements or by regulation. The 31 Eastern states in general have a system of water law containing riparian rules for surface water, private ownership of ground water, and nuisance provisions for flood water.

Riparian rules for surface water simply mean the landowner adjacent to surface water may use it as he sees fit so long as the water below him is undiminished in "quantity and quality."¹ Irrigation or other consumptive use of water is not provided for so long as the source is surface water.

Rights to ground water are the property of the owner of the land surface and in most states the landowner may use the ground water without regard to the affect on adjacent landowners. Here any use of ground water is permitted. The landowner for little gain may damage the water supply of his neighbors and the community.

Flood water (surface water not confined to a definite water course) is generally treated as a nuisance. A landowner may take any action to rid his land of flood water, including building a wall to divert water to

¹ The riparian may, in most states, use any amount for domestic and stock watering purposes.

another's land or digging a channel to release the water on his neighbor's house or barn.

This very brief and simplified generalization of the basic water rules in the humid areas should be used with caution. Each state is responsible for its own rules and hence modifications have been made to meet the situations in the several states. The result is that no two states have identical rules. Also, some states have already embarked on the job of making major revisions in water law.

Why are we concerned with the use of water in the humid areas? Our concern has developed mainly because of the rapid increase of the use of water for consumptive purposes.²

Rapid increase in consumptive water uses is primarily associated with technological advance. Concentration of people in urban centers has increased the water demands for domestic use. Air conditioning in homes, stores, and factories has required greatly expanded amounts of water. Large quantities of water are needed by our industries. In fact, adequate water supplies have become the strategic factor in the location of many of our new industrial establishments. Nearly all municipalities are confronted with the problem of developing adequate water supplies and usually at increasing cost. One of Wisconsin's small industrial cities had to deliver three times as much water in 1948 as it did in 1920.

The urbanization of our population will continue, as will our industrial expansion. Water will become progressively more scarce in the humid areas and this will present increasingly difficult problems of resolving conflicting uses, i.e. allocating the scarce water resources.

In agriculture, technological advance has made water a limiting factor for crop production even in areas with over 30 inches rainfall. Many of the 31 Eastern states are doing research and extension on the subject of irrigation. In 1951, Wisconsin had above average rainfall and cool weather. Even so, one of our experiments on Central Wisconsin sand resulted in an increase from 45 bushels of dry shelled corn per acre where no water was applied to 100 bushels where water was applied. Experiments indicate that on high valued crops, irrigation will pay the \$40-\$100 an acre investment in irrigation equipment plus the operating costs. However, water alone is not enough. Adequate application of fertilizer, good seed, and knowledge of when and how much water should be applied, all are necessary to increase production with irrigation. In short, our technical knowledge in agriculture has made water a limiting factor.

Large Potential for Irrigation in Humid Areas

Although irrigation is not widespread in the humid areas (500-600

² Pollution has been a vital problem and will continue to increase with further urbanization and industrialization.

farmers in Wisconsin), its potential is large. Farmers are considering investments in irrigation equipment and there is much public discussion about irrigation. Irrigation is spectacular. On the other hand, conservation groups are pointing to agriculture as destroying a public resource.

It is true that irrigation is a consumptive use of water and as such was not considered when our water rules in the humid areas were established.

So, we have an increase or a possible increase in consumptive uses of water. These uses conflict with each other, and also with non-consumptive uses such as recreation, power, etc.

The real water issue in the so-called humid areas is how to resolve these conflicting interests. The market mechanism has not and will not resolve these conflicts. If we do nothing, these conflicts will be settled by the courts each time a case gets bad enough to come before it. The courts will decide each case on the basis of the facts before it and the rules we have been operating under in the humid areas. The result may very well be a set of decisions which are neither uniform nor calculated to make the best use of the scarce water resource. The court does not have the staff necessary to evaluate the conflicting interests which arise. Also, we should retain and encourage the notion that all citizens of the state, not just two conflicting parties, have an interest in adequate water supplies.

Real thought and planning should go into the allocating of scarce water supplies among the various users, whether they be consumptive or non-consumptive.

A general water policy should be formulated at the state level since, in humid areas, state rules are primarily involved. Particularly difficult in the formulation of this policy is the question of what is public interest. In the humid areas, certain conservation groups have gained rather wide acceptance of the notion that the public interest is maintaining our water resources in their present state. Somehow we should get to the concept that public interest in water would seem to be the accommodation of increasing uses to a scarce supply so that the greatest economic and social advantage can be secured from the resource.

The process used to formulate the policy is of utmost importance. It must be the combined judgment not only of technicians but also of administrative officials, legislators, and the people concerned. They must participate in the formulation and it must be their policy.

THE ECONOMICS OF GRASSLAND FARMING

Chairman: H. B. James, North Carolina State College

THE ECONOMICS OF GRASSLAND FARMING IN THE NORTHEAST

IRVING F. FELLOWS
University of Connecticut

BASIC economic relationships in grassland farming remain the same for all areas of the country. But, the regional emphasis given to the topic underlines the fact that segments of the problem must receive different emphasis in different areas. A brief statement on forage production and use in the Northeast will help to select those segments which are of particular importance in the area.

The Northeast is a feed deficit area. In general, no large inshipments of roughage occur; but, excluding poultry, about 50 per cent of the feed concentrates for farm livestock are obtained from outside the region. This amounts to about 4,000,000 tons of feed grains and commercial by-products for the 11 Northeastern states. In Connecticut and other southern New England states, it is approximately correct to say that all feed concentrates used by forage-consuming livestock is shipped in.

Dairying Important in Livestock Industry

Excluding poultry production, dairying dominates the livestock industries in most of the Northeast. When one speaks of grassland farming in the area, primarily he is discussing the influence upon some farm return by the use of forage in the dairy industry.

In part, the development of the dairy industry has been due to the general adaptation of the area to the production of grasses and legumes. The level and distribution of precipitation and the temperature are favorable for the production of forage. But, our soils pose a special problem. Much of the land area was glaciated. Now it is rough and rocky, and soils are mixed in a hodgepodge. In one small field, several major soil types may exist. Brown soils were built up under a forest cover, but the rains leached soluble minerals from the upper layers and deposited them in lower horizons. The thin layer which contained organic matter has been reduced materially by cultivation. Trees are the climax crop. Our fields were chopped from the forests, and the forests reclaim them unless there is a continual program to maintain the grasses.

Production of high-quality forages calls for crop selection, cultivation, additions of soil amendments, and special cultural practices. This situa-

farmers in Wisconsin), its potential is large. Farmers are considering investments in irrigation equipment and there is much public discussion about irrigation. Irrigation is spectacular. On the other hand, conservation groups are pointing to agriculture as destroying a public resource.

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tion has given direction to a major phase of the research programs at the several Agricultural Experiment Stations. New kinds of crops have been sought; new production practices have been tested.

In the last 15 years, there has been a revolution in forage production. We are very proud of the part played by the agronomists at the University of Connecticut. In 1930, they recognized the potentialities of ladino clover and set about to determine management requirements for successful production of the crop. Now, ladino clover mixtures are the backbone of most progressive forage production programs. By 1940, tractors were well adapted to Northeastern farm conditions and were rapidly adopted by dairymen. The availability of tractor power made feasible the adoption of new forage-harvesting equipment and methods.

This will suffice for the setting. Perhaps you have noticed a complete lack of reference to research in the economics of forage production and use. I believe I have given the emphasis our efforts deserve. For the most part, we in farm management in the Northeast were content to say that a farmer should grow one acre of ladino hay-pasture-combination per cow, that 10 per cent of the farmers used one method of harvesting while 80 per cent used another. Or, somewhat more critically, that the average cost of harvesting with a forage harvester was eight dollars per ton, whereas the average cost with another system was four dollars per ton. Exceptions occurred, but generally our work provided facts that could or could not be of value to a farm operator and, therefore, should not have been used. Happily, most of them were not. Our farmers were much better managers than we. They adopted the new crops and methods and made complementary changes in the business organization—usually to their betterment.

But let us pass quickly over this self criticism and ask the question: can we make an economic evaluation of forage production that will be helpful to Northeastern dairymen in their management problems? I believe we can if (1) we think like economists, and (2) if we act like the old-time family doctor.

Economists Should Be "Tool Users"

I know we become cynical toward the admonition to think like economists. But our record has not been good. All too often we talk in terms which are contrary to the most elementary economic concepts.

Most of us are and should be "tool users." In 1939, a book was published by Hicks¹ which made available new and powerful tools. He demonstrated the important interrelationships between factors and

¹ Most of the ideas in *Value and Capital* had been expressed in various forms before. Hicks was of strategic importance, however, as an integrator and a publisher in English.

products in the firm, and the economic implications under several assumed situations. Some agricultural economists have demonstrated the usefulness of these concepts when applied to farm management problems. In addition, the implications of the concepts have been developed. Now, we are better able to cope with problems in which expectations are not single-valued.

An appraisal of the economies of forage production and use must be related to these concepts. They provide the model which makes explicit the implicit assumptions that underline logical deductions in the field, which provides a consistent system relative to ends and assumptions, and which furnishes the hypotheses by which relationships can be tested. On this point, Heady has written:

In a practical vein an analytical model can be looked upon as a mental picture of the relationships (qualitative and quantitative) involved. The model also suggests conditions which must hold for maximization of a given end and thus indicates the kind and quantity of data necessary for its solution.²

Development of the theoretical model is a necessary first step in the solution of any farm management problem. But it is not a sufficient step. Care must be exercised that the model does not become an end in itself. Unless a second step is taken, the model builders commit the same type of error as did the "ratio" builder and the "factor" builders, in spite of greater scientific integrity and exactitude—that is, the belief that a farm management problem is solved by the mechanism of some tool which is available.

Also, models call for specific types of information which are universally lacking in farm management. Another danger is that the technician will become discouraged and simply state that further developments must wait until more research is accomplished in other sciences.

The second step is the recognition of the unique setting of each management problem. When the old-time family doctor set his black bag on the kitchen table, he was in about the same position as the farm-management technician. His few inadequate tools were a starting point, but he knew they did not heal. He knew his patient as an individual who had certain strengths and weaknesses. With all these data, he attempted to provide a unique solution by which the patient could help himself. Our farm management problems are unique. Each calls for unique solutions. Each solution must be made by the farm operator.

Now, perhaps, we can approach the problem of the economics of forage production and use. Research on this subject at Connecticut is underway with an attempt to meet the following conditions:

- (1) that an economic model guide the appraisal,

² E. O. Heady, "Implications of Particular Economics," *This Journal*, November 1949, p. 842.

- (2) that unique solutions be possible, and
- (3) that solutions can be obtained by the farm operator.

The model chosen for this task was consistent with the end of profit maximization and imposed particular assumptions (Figure 1). In the main, these concerned partial equilibrium of the firm under static and

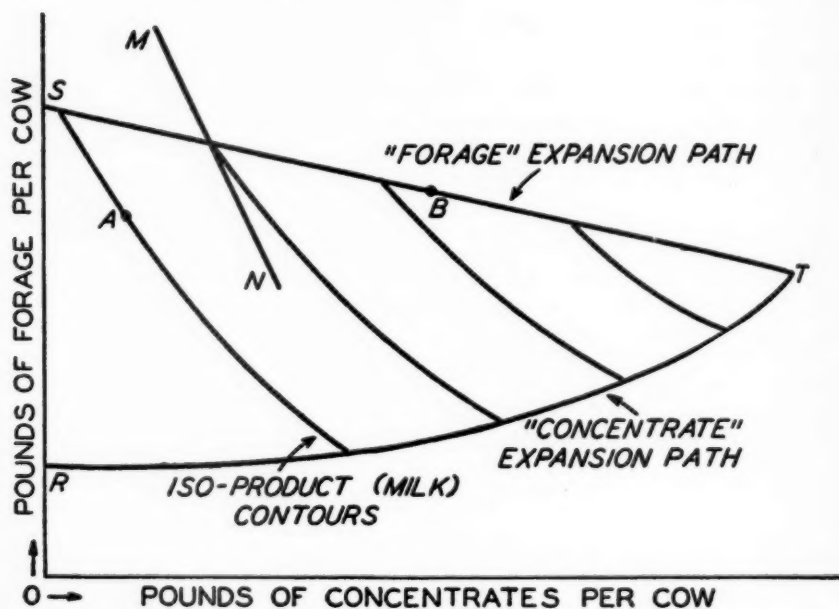


FIG. 1.—Hypothetical solution to permit adjustment in milk output along the "forage" expansion path when forage and concentrates are imperfect input substitutes in dairying.

competitive conditions when two factors which were imperfect substitutes were used with other fixed factors in the production of a single product. However, perfect knowledge of some production functions and prices did not exist. Some of the parameter were permitted to become variables in an interpretation of results.

Because of physiological characteristics of the dairy animal, RST is the relevant area of the production surface showing the structural relationships between milk, forage, and concentrates. Line ST is the upper limit on forage intake and is functionally related to milk output and concentrates intake. Considerable data are available concerning the technical relationships along this line. Line RT is the upper limit of concentrate intake given a minimum forage intake sufficient for output. Little is known about this line. Practically no data are available concerning the surface between these limits.

Must We Wait For Further Research?

If prices and marginal substitution and transformation rates were available, an economic solution could be obtained readily by determining first, the optimum combination of the factors; and second, the optimum factor allocation by following up the expansion path. As sufficient data are not available, one could state that this phase of grassland economics must wait upon further research in animal nutrition. Must we accept this decision?

One possible expansion path is along the upper limit of forage intake. Let us force this to be the expansion path by equating the price ratio of the two factors (MN) to their marginal rates of substitution along the line. What we have done is to establish a limit on the price of forage and also we have limited the applicability of our results.

Such a "forcing" is not too unrealistic. If the factors were close substitutes in the relevant area, the contours would have only slight curvatures. Fragmentary evidence gives some credence to this hypothesis. Price ratios rotating about points of intersection of contours at the upper forage limit could change considerably before the optimum combination would move along the contour. With the institutional imperfection in milk marketing in the Northeast, the use of land for forage production has a considerable advantage over alternative opportunities.

Studies are available at several of the experiment stations to help describe the "forage" expansion path. Using information from U. S. Department of Agriculture input-output studies,³ the functional relationship between the dependent variable, milk, and the independent variable, concentrates, is

$$Y = 2400X_2^{0.16603}; \text{ and,}$$

between forage and concentrates, is

$$X_1 = 11,500 - 0.7561X_2.$$

Along the "forage" expansion path the marginal rates of substitution have been estimated by Redman⁴ as 1 to 3.7 at the 7,000-pound contour, 1 to 2.4 at the 8,000-pound contour, and 1 to 2 at the 9,000-pound contour. For these particular situations, the ratio is given to which the farm operator can adjust the price ratio of the two inputs.

This limiting solution would be immediate if there existed a price for forage. No such price exists. By substituting marginal costs of producing forage for the price, the model presents wide and useful possibilities.

³ Einar Jensen and others. *Input-Output Relationships in Milk Production*, U.S.D.A. Technical Bulletin 815, Washington, D.C., June, 1942.

⁴ John Redman, "Economic Considerations of Grain-Roughage Substitution in Feeding for Milk Production," unpublished Ph.D. dissertation, University of Kentucky, 1951.

Each farm operator is now able to determine the extent of forage production activities on his farm as long as the forage can be consumed. Unique evaluations are possible. The additional costs of removing rocks or brush from his fields, adding soil amendments under his conditions, and experiencing the crop responses for his soils have meaning in the over-all forage program. As some forages must be stored, alternative harvesting and storing methods can be evaluated for his particular situation. Production functions can be compared acre by acre, practice by practice, farm by farm.

One restriction was that the operator must be able to use the additional roughage. This would be possible in some instances (A in Figure 1) when the cow could consume more roughage and thereby move to a higher production contour. Throughout many Northeastern herds, this would be a frequent possibility, especially during the pasture period. When the cow cannot consume more roughage (B in Figure 1), additional cows would need to be added. The profitability of movement along the "forage" expansion path could be tested only by budgeting each situation.

This model cannot solve all the problems of grassland economics. In fact, we cannot derive the true equilibrium solution. But, with these concepts, we can provide meaningful limits in the forage program of each operator. Management practices can be compared within a unique setting by the farmer, and forage production and use can be considered as an integrated problem. Of greatest importance, it diverts the thinking of farmers and those who assist the farmer away from the objectives of wide milk-grain ratios and of maximum grass acreages toward the goal of change in net farm income.

ECONOMICS OF GRASSLAND FARMING IN THE CORNBELT

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CONSIDERABLE interest within the past few years has been focused on an area of agriculture commonly referred to as grassland farming. A plausible reason for this development is that over the years forages have not received the same degree of emphasis as other crops.¹ Some persons are even willing to go so far as to say that with somewhere near equal attention to forage crops a new frontier in agriculture will be opened up—that within this frontier lies the key to the greatest potential in agriculture, today.

History shows that new frontiers are usually surrounded by glamour and propaganda. In Michigan, we feel that much of the present day publicity concerning grassland farming is grossly overdone. The problem is nothing more than the age old problem of farm management with emphasis on forages. The remainder of my remarks will be directed with this vein of thought in mind.

In organizing a farm, we recognize that soil characteristics of the land pretty much determine or set the limits for the minimum amount of grass which should be included in a cropping program. Generally, this minimum is referred to as being the least amount of grass required to maintain soil fertility and crop production. As one might expect, this limiting factor may vary greatly from farm to farm. Between the corn belt and those farms located elsewhere, even larger differences may be anticipated. In Michigan on a large number of our farms where the land is less fertile and rolling, the percentage in grass may be 35 to 40 more as compared to only 20 to 25 per cent on corn belt farms. It is even suspected that on the best corn belt farms, having deep level top-soil subject to little erosion, the proportion necessary in grass may be approaching zero. For such farms, it may possibly be more economical to supply nitrogen from the bag (commercially) than to attempt to provide it by growing legumes.

It is generally agreed that on a good share of our farms there is a possible range over and above the minimum of grass where other characteristics besides soil characteristics play a major role in deciding the best propor-

¹Dr. W. M. Meyers, director of field crop research of the Agricultural Research Administration of the U.S.D.A., stated November 13, 1951 before the annual meeting of the Association of Land Grant Colleges and Universities: "... that in the field of forage crops we are at least a quarter of a century behind research on other major agricultural problems and that few are aware of the meager foundation of research facts and materials available today for constructing grassland farming programs."

tion in grass. First, over and above the minimum amount of grass needed, there may be either a complimentary or a competitive range which we would like to take into consideration. However, it is believed only a framework for this type of material has been set up and at present it is not used to any great extent in organizing a farm.² Other important considerations may be a farm's size, location, supply and kind of labor, available capital and credit, prices, and the goal and ability of its management. It is quite apparent from this that what may be the best proportion in grass for one farm may be entirely different from that for another.

With these things in mind, we would say the budget method offers the best solution available today for appraising the economics of grassland farming. Let's mention a couple of the reasons for liking budgets. One is that they offer a good means for comparing and arriving at the potentialities of different programs; another is that the effect of any change within a program can be measured in terms of its effect on the over-all farm program on the basis of net farm earnings.

Biggest drawback to budgeting today is the amount of time required to do a good job and a lack of qualified personnel. Where these conditions have been encountered and where it is difficult to do a satisfactory job of budgeting, we, along with others, have resorted to a simple rule-of-thumb method. This method is passed along with reservations realizing it does not take into consideration many important factors. However, we have found that for a quick method of appraisal and where some judgment is used, it will come close in most cases to giving an acceptable answer. The principle of this method is nothing more than seeing that the cropping program on a farm is organized at or above the minimum percentage in grass depending on the amount of labor available. In this method, we try to organize a farm so each man available will be provided with between 350 to 400 P.D.W. (Productive Days of Work) as we compute P.D.W. per man. On a two man farm this would mean a total of 700 to 800 P.D.W.

If we had a 200 tillable acre farm with the minimum amount of grass at 40 per cent, this would mean 80 acres of forage. This amount of forage would support about 25-30 animal units of forage consuming livestock. To organize a 200 tillable acre farm in this situation to provide 700 to 800 P.D.W. would necessitate going to either a deferred cattle-hog feeding program or a dairy program. A beef cow or sheep program would require too little labor. If more labor, say half a man (or the equivalent of 175 to 200 P.D.W.) were available we would add more dairy cows and increase

² Heady's work on rotations, Glenn Johnson's on risk and uncertainty, Ray Hogg-lund's and John Redman's on forage-grain substitution are examples of some of the most recent work in these fields. Only the lack of sufficient input-output information hampers their more general use and acceptance.

the forage acreage from 40 to 60 per cent. In the corn belt one could go to more grass, but it is more likely that one would buy more grain and feed enough additional livestock to utilize the labor.

Let's cite another instance. If we had only one man's labor available on a 200 tillable acre farm where the minimum was at 25 per cent forage, to organize this farm to provide 350 to 400 P.D.W., we would set it up as a cash crop farm. The reason for this is that at 25 per cent forage (corn, corn, oats, hay), the cropping program would provide about 1½ P.D.W. per man per tillable acre. If this same farm had a minimum of 60 per cent forage (wheat, oats, hay, hay, hay), the cropping program would provide as little as only ½ P.D.W. per man per tillable acre, which would mean we would suggest providing the additional work by increasing the number of forage consuming livestock.

This is not presented as the only answer to the problem up for discussion. Instead, it has been presented as a simple, quick rule of the thumb method for arriving at an approximate answer. To more adequately and conclusively state the economics of grassland farming will require the study of a great many more facts and figures than we now have available. We need considerable more and better input-output data concerning risk and uncertainty, cultural practices, production, and management. In the meantime, we should keep in mind that grassland farming is in a dynamic stage. To compare present systems of grassland farming with older established systems may be like comparing corn production today with corn production in the time of the Indians or earlier settlers.

ECONOMICS OF GRASSLAND FARMING IN THE SOUTHEAST

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IN THE last decade, grassland farming in the Southeast achieved a more prominent place in farming systems than it had previously held. In this region, as in others, it is inseparably linked to livestock production. "Grassland farming" is a widely-used term. It may have a number of different meanings but let us consider it as: The use of grazing or forage crops alone or to complement cropping systems in producing the feed supplies required for livestock maintained on the farm whereby the most efficient use of land and other resources are provided for. By this definition, grassland farming is not necessarily an extensive system of farming nor does it require that all or most of the land be used for grazing crops.

Economic Reasons for Grassland Farming

The increase in importance of grassland farming today is primarily the result of changing economic conditions. Perhaps the chief reasons or economic justifications for encouraging grassland farming in this area are evidenced by the growing demand for increased production stemming from demands for a high level of living from a population increasing at the rate of 2.5 million a year in the United States, and the continued high demand for food exports which is part of the effort to achieve world peace. Achievement of a high level of production to meet these demands calls for fuller and more efficient use of agricultural resources.

In addition, however, grassland farming provides an opportunity for efficient use of much of the idle land and other unused resources in the South. From 1940 to 1950, the total land used for harvested crops in the six Southeastern states (Alabama, Georgia, Florida, Mississippi, North Carolina, and South Carolina) decreased from 38,955,000 to 29,239,000 acres. Some of this cropland diverted from the production of harvested crops was put to grazing crops but a much greater potential grazing acreage reverted to idle land. Preliminary reports from the 1950 Census show that the idle cropland in these six Southeastern states increased from 4,726,444 acres in 1939 to 7,515,209 in 1949.

An additional reason for grassland farming is that it helps to conserve soil and maintain soil fertility, thus increasing the long-time efficiency of land and other production factors. Under a system of row-crop production and clean cultivation, the heavy rainfall prevalent in the South during certain seasons has resulted in excessive runoff. Valuable plant food nutrients have been carried away in this runoff and in many places

soil has been removed to the extent that whole fields are laid waste with gullies. Grazing crops provide a permanent cover which helps to conserve water and soil. Retarding runoff by the use of grazing crops also has value as a flood-control measure.

Still another major economic reason for encouraging grassland farming in the Southeast is the need for adjustments in farming systems to available labor supply and changing technology in agriculture. The industrial revolution transformed American industry from a system of small artisan shops to large-scale manufacturing. Some of these forces are operating today; their influence on agriculture and industry in the South is just as pronounced. Preliminary estimates of the 1950 Census show for the 17 Southern States 868,846 fewer people employed in agriculture in 1950 than in 1940, a reduction of 20 per cent in the labor force. Non-agricultural employment during this same period increased 40 per cent.¹ This reduction in the agricultural labor force has encouraged shifts from cotton and corn to crops that require less man labor. Farm mechanization has made much greater progress in reducing labor requirements for close growing crops, including grazing crops, in the Southeast than it has for cotton and corn. Thus, grazing crops utilize land resources more fully through the use of more mechanical power and a more equitable seasonal distribution of labor requirements resulting in fewer workers. Meanwhile, the increase in non-agricultural workers has increased the purchasing power and demand for milk and meat which are the products of grassland farming—thus again pointing to a need for more grazing crops.

Finally, as a result of improved agronomic methods developed for grassland farming in the Southeast and of changes in economic conditions, grazing and forage crops have changed their competitive position with other cash crops in the area. As long as labor was a relatively plentiful factor of production, use of mechanical power increased very little. Under these conditions, grassland farming ranked low in competition with cash crops. But new varieties and improved fertilizer practices resulting in higher yields of grazing crops and the adaptability of grazing crops to the use of power machinery, accompanied by increases in farm prices, have changed the comparative advantage of grazing crops. Under some conditions that prevail in the Southeast today, grassland farming is undoubtedly the most efficient system of farming.

Potentialities for Production of Grazing Crops

The natural environment, climate, and soils, of the Southeast favor a forest vegetation. The native forage grasses are inferior in quality in

¹ 1950 Census of Population Preliminary Report Series PC-7, No. 2. The greater South includes the 17 state areas including the South Atlantic, East South Central, and West South Central States.

comparison to those in the Western and Midwestern grazing regions. The relatively low nutritive value of grasses, legumes, and other forage plants in the Southeast was a prime factor in determining the pattern of land use in colonial agriculture. As a result of intensive research, new crops and new varieties have been introduced and new agronomic methods developed that offer substantial improvement in the production of grazing crops in the Southeast. But agronomists predict that intensive work over a long period of time will be required to develop a large selection of high producing and nutritious forage crops adapted to the climate and the wide variety of soil characteristics of the Southeastern native forested area.

Some of the known agronomic factors associated with grassland farming in the Southeast have been summarized as follows:

1. Grazing crops, particularly legumes, grow better in a soil not strongly acid. As most of the soils tend to be acid, they require from one-half to one ton of lime per acre for proper conditioning of soils for grazing or forage crops.
2. Most grazing crops respond favorably to heavy rates of fertilization, especially nitrogen.
3. The fertilizing treatment alters the quality of grazing crops by changing the chemical composition of the plants in accordance with the employed nutrients and by alterations in their botanical composition.
4. The growth of forage and grazing crops is subject to wide seasonal variations in relation to seasonal variations in temperature and rainfall.
5. The large selection of grasses and legumes in combination with a mild climate makes it possible to develop systems of year-round grazing in the Southeast.

We know from experimental work and from experience of farmers in other states, and from a like experience of a limited number of farmers in the Southeast, that a much higher proportion of the total feed nutrients required for meat and milk production in the Southeast could be derived from high quality forage with attendant increases in efficiency in use of resources.

In Tennessee, milk cows have been carried through successive lactations on forage alone and have produced 8,000 pounds of milk annually. Cows in New Jersey fed high-quality pasture, hay and grass silage, but no concentrates, produced an average of 8,400 pounds of milk annually during a five-year period. The average production per cow in the Southeast was only 3,562 pounds in 1951. Thus, potentially, milk production

per cow could be doubled without feeding any concentrates. In South Carolina, selected dairy farms obtained only 45 per cent of the total feed nutrients from grazing crops in 1948-49 but at a cost per unit of digestible nutrients of only 63 per cent the cost per unit from concentrates.

Throughout the Southeast, experiment stations and farmers have maintained beef herds the year round, have produced high quality veal calves, and have finished steers to choice grades on grazing crops alone. Gains of more than three pounds a day were obtained from winter grazing of steers at Tifton, Georgia. These are but a few of the results available, relative to the potentialities for grassland farming in the Southeast.

Potentials for Greater Total Production

I have cited a few of the many experimental results to illustrate that grassland farming is feasible in the Southeast. It is highly speculative to forecast how fast and how far the development of grassland farming will go in the Southeast. It is perhaps even more speculative to predict the nature of the development or the kind of crops that will make up Southeastern pastures in the future. As many combinations are possible as radii that can be drawn from one center. But I have speculated a bit and calculated some results that would be possible if all the idle cropland in the Southeastern states were used for improved pastures.

The combination of grazing crops I have used is only one of many possibilities. Conservative estimates of potentials based on experimental results indicate that the idle land reported in 1950 could produce an average of 307 pounds of beef per acre, or a total of over two billion pounds annually. This is more than twice the quantity of beef produced in these states in 1950. Added to this potential is the increased production that could be obtained by improving the production practices of existing grazing crops and by clearing forested areas adapted to use for grazing crops. Based on current production costs of recommended practices, the annual costs of these improved pastures would be equivalent to 10.5 cents per pound of beef produced, or about \$32 an acre.

Development of improved pastures on this idle land would call for a capital outlay of 454 million dollars or an average of about \$60 an acre, including the cost of fencing. Should the idle land be devoted to improved pastures, maintaining all of it at a high level of production would require about 90,000 tons of nitrogen, 361,000 tons of P_2O_5 and 180,000 tons of K_2O annually.

Of course, all of the idle land in the Southeast is not likely to be used for grazing crops, and if it were it would not all be used for beef production; but this illustrates a potentiality should adjustment be geared to move in that direction.

Evaluating the Place of Forage Crops in Farming Systems

Grassland farming should fit the farm. Just what kind of grazing crops and how much and what kind of production practices should be used will depend on a number of conditions. If we think of national policies and programs, it is basically important to consider the national demand schedule in deciding the relative importance of grazing crops in our farming systems. To the individual farmer, however, growing grazing crops is an alternative use of his production resources. Therefore, consideration must be given to the land, labor, machinery, and other capital requirements of grazing crops in relation to other alternative uses and to the expected returns from the use of these resources.

We have learned how to grow forage crops. Year-round grazing is possible with proper management but it does not just happen. Utilization of forage crops for high quality hay and silage offers possibilities for economies in livestock production, but this too requires new allocations of labor, management, and capital. In the South, we know more about the production requirements of forage crops than about their use. We need to maintain a livestock-feed balance when planning a farm, but to do this we need to know a great deal about the feeding values of different kinds of crops and the seasonal variations in production and nutritive value of grazing crops. Little information of this kind is available and much of it requires judgment modification to fit the needs of an individual farm.

Pasture yields have been expressed in a number of different ways but if we are to use the yield data to determine feed balance, the yields should be expressed in some unit of feed value such as a measure of net energy or of total digestible nutrients.

Determination of a livestock feed balance for a farm requires a knowledge of the feed requirements for the kinds of animals fed related to their expected functions. Most investigators have relied upon Morrison's feeding standards for this information. The degree of refinement in use of these standards varies a great deal. Some investigators estimate only annual requirements for maintenance, growth and milk production based on crude estimates of weights and production. Others make careful seasonal calculations based on actual weights of the animals and analysis and weight of milk production.

Since grazing crops are subject to wide seasonal variations in their yields, expressed in terms of total digestible nutrients, and since the requirements for animals vary according to their size and function, it is important to determine the feed and livestock balance on a monthly or seasonal basis.

Almost any system of grassland farming that provides adequate grazing

during all seasons of the year will have a surplus during some seasons. Several ways of handling these surpluses are the following: (1) Hay or silage could be harvested from some of the acreage; (2) Grass or legume seed could be saved from some of the acreage; (3) Adjustments could be made in the number of animals fed. This method introduces a number of problems that rule it out on most farms on which the number of livestock fed are about the same during all seasons; (4) Carry more livestock than the low seasonal level of forage production will support and then either buy feed or save hay or silage. This method would not provide adequate grazing during all seasons and the pastures would more likely be damaged as a result of overgrazing.

As feeding of some harvested forage is desirable, the practical solution to seasonal surpluses of grazing crops seems to be the conservation of forage crops for hay or silage. The kind of machinery and storage facilities available is important in deciding the method used on individual farms. For the small farm, putting up loose hay might be the best solution as it requires a smaller investment in machinery. But larger farms that are equipped with efficient machinery for handling hay, silage, or a seed crop have more alternative uses for surplus grazing crops. Fitting a grazing system to any farm and deciding on the alternative uses of some of the grazing crops constitute a complex management problem that must be decided for individual farmers in light of many other factors we have mentioned.

The guiding principles in making the decision should be (1) the need for forage crops in a rotation system; (2) the need for forage crops to meet feed requirements; (3) the need for forage crops as a means of adjusting farm operations to meet the labor supply; and (4) adapting the production and conservation of forage crops to the kind of machinery available, or that could be used efficiently and economically on a particular farm. I know of no better tool for making such an appraisal than the use of farm budgets.

Summary

"Grassland farming," that is, the use of forage and grazing crops alone or to complement cropping systems in the production of feed for livestock, has outstanding potentialities in the Southeastern states. The physical potentials for production and use of grazing crops have been successfully demonstrated by Experiment Stations as well as on individual farms. Economic reasons or justifications for grassland farming in this region include:

1. Increasing demands for livestock products.
2. Opportunities for efficient use of idle land and other unused resources.

3. The value of grazing crops in conserving and maintaining soil fertility.
4. The need for adjustments in farming systems to available labor supply and changing technology in agriculture.
5. The more favorable competitive position of grazing crops in relation to other crops as a result of changing technology and economic conditions.

Realizing the potentialities and taking advantage of the economic opportunities for grassland farming in the South present new and complex management problems. As we find the answers to these problems through research, the educational programs should be reoriented and directed to provide the kind of management training that is needed. This is the challenge to farm management workers.

THEORY AND TECHNIQUES APPLICABLE TO FARM MANAGEMENT RESEARCH

Chairman: Lowell Hardin, Purdue University

USE AND ESTIMATION OF INPUT-OUTPUT RELATIONSHIPS OR PRODUCTIVITY COEFFICIENTS*

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INPUT-OUTPUT relationships are the partial basis for the majority of recommendations by agricultural economists. They include a wide range of coefficients or quantities and can be estimated for a single technical unit (an animal or an acre of land), for a farm as an economic unit or for an agricultural region or other aggregative unit. They can be derived on a purely physical basis or on a value basis.

The complete implications of input-output coefficients in agriculture are not generally recognized. It is true, of course, that the need for and use of productivity coefficients (including the marginal output for each increment of resource, substitution ratios, etc.) are recognized in recommendations for (1) the quantity and combinations of resources to be used by farmers and (2) the manner in which the national policies can facilitate a more efficient use of the nation's agricultural resources.

In order to provide a more complete basis for the derivation of production functions in agriculture, we review some additional areas in which the validity of the procedures employed depends on the underlying input-output schedules. Certain assumptions about the nature of input-output relationships (i.e. the production function) are employed by all agricultural economists who compute residual returns to single factors of production. This statement applies to procedures which: (a) use the "productivity method" of valuing land; (b) compute labor or management returns to show the "most profitable" farming system, practice or scale; (c) compute labor productivity for agricultural regions or nations; (d) estimate tenant and landlord returns on the basis of contributions (i.e. divide the income into portions attributable to different sets of resources); (e) attempt to estimate the value of an acre of pasture; and so forth.¹

* Journal paper J-2152, Project 1135, Iowa Agricultural Experiment Station.

¹ For examples of residual imputational procedures, see W. G. Murray, *Farm Appraisal*, Iowa State College Press, Ames, 1941; T. W. Schultz, *Production and Welfare in Agriculture*, Macmillan, New York, 1949, Chap. 7; Colin Clark, *The Economics of 1960*, Macmillan, New York, 1943, p. 30-40; R. L. Christensen, *Using Food Resources Efficiently*, USDA Technical Bulletin; G. F. Warren, *Farm Management*, Macmillan, New York, 1916, pp. 559-560.

Persons who use these procedures, perhaps unwittingly, assume constant input-output relationships (linear production functions) or constant returns to scale.²

Assumptions of Input-Output Coefficients in Residual Imputations

It is therefore of first-order importance that production economists have greater knowledge of input-output coefficients. Otherwise, as we show below, extreme errors may attach to the estimated reward or value of a single factor. In the residual imputation process, so widely used in production economics, the market price of each resource (except the one for which estimates are made) is multiplied by the quantity of the resource, the products are summed and subtracted from the total return; the figure obtained is used as the "return" of the resource in question. The procedure is that of (I) below where we have four resources and a total value product of Y . The P 's refer to prices of the respective resources. The value of the product (the portion of the return) attributable to resource X_1 is being estimated. The procedure is valid only if the condition of (II) holds true; namely, the sums of the quantities of resources multiplied by their prices must equal the total value product.

$$P_1X_1 = Y - (P_2X_2 + P_3X_3 + P_4X_4) \quad (I)$$

$$Y = P_1X_1 + P_2X_2 + P_3X_3 + P_4X_4 \quad (II)$$

This condition can be attained under competitive situations only if (a) the prices of the factors are equal to their marginal value products and (b) constant returns to scale prevail. In other words the procedure of equation (I) assumes (II) and hence (III). In (III) we have simply substituted in the

$$Y = \left(P_p \frac{\Delta Y}{\Delta X_1} \right) X_1 + \left(P_p \frac{\Delta Y}{\Delta X_2} \right) X_2 + \left(P_p \frac{\Delta Y}{\Delta X_3} \right) X_3 + \left(P_p \frac{\Delta Y}{\Delta X_4} \right) X_4 \quad (III)$$

$\left(P_p \frac{\Delta Y}{\Delta X} \right)$'s for the P 's for the factors to conform to the assumption that the marginal value product (the input-output ratio expressed in value where P_p refers to the product price) is equal to the price of each resource. It can be proven mathematically that shares imputed in the manner above "just exhaust" the total product if constant input-output coefficients (constant returns to scale) prevail.³ If increasing returns to scale hold true,

² Cf. Earl O. Heady, *Economics of Agricultural Production and Resource Use*, Prentice Hall, New York, 1952, see Chap. 13.

³ These statements can be proven with the single-factor example below. If we have a constant input-output ratio and constant returns to scale, the per cent increase in

equation (II) becomes (IV) while it becomes (V) if decreasing returns prevail. If increasing returns to scale hold true, the residual technique will underestimate the return or value of the resource being examined; under decreasing returns, the opposite will hold true.

$$Y < \left(P_p \frac{\Delta Y}{\Delta X_1} \right) X_1 + \left(P_p \frac{\Delta Y}{\Delta X_2} \right) X_2 + \left(P_p \frac{\Delta Y}{\Delta X_3} \right) X_3 + \left(P_p \frac{\Delta Y}{\Delta X_4} \right) X_4 \quad (IV)$$

$$Y > \left(P_p \frac{\Delta Y}{\Delta X_1} \right) X_1 + \left(P_p \frac{\Delta Y}{\Delta X_2} \right) X_2 + \left(P_p \frac{\Delta Y}{\Delta X_3} \right) X_3 + \left(P_p \frac{\Delta Y}{\Delta X_4} \right) X_4 \quad (V)$$

There is no basis for imputing the residual (V) or deficit (IV) to one resource rather than another.

We have illustrated that the nature of input-output ratios are needed not alone for their customary usages in agricultural economics but also for a great number of other problems. Estimation of production functions in agriculture is indeed important.

On the following pages, we discuss some problems and procedures involved in estimating input-output relationships for (1) technical units—a cow, an acre of land—(2) farms, and (3) regions or other aggregative units. Time limitations allow only a sketching of alternatives and their shortcomings. We use the terms “input-output relationship” and “production function” synonymously; both relate total factor input to total product

the product is equal to the per cent increase in the factor.

A. Constant returns

$$1. \quad \frac{\Delta Y}{Y} = \frac{\Delta X}{X}$$

$$2. \quad \Delta Y = Y \frac{\Delta X}{X}$$

$$3. \quad X \Delta Y = Y \Delta X$$

$$4. \quad X \frac{\Delta Y}{\Delta X} = Y$$

B. Increasing returns

$$\frac{\Delta Y}{Y} > \frac{\Delta X}{X}$$

$$\Delta Y > Y \frac{\Delta X}{X}$$

$$X \Delta Y > Y \Delta X$$

$$X \frac{\Delta Y}{\Delta X} > Y$$

C. Decreasing returns

$$\frac{\Delta Y}{Y} < \frac{\Delta X}{X}$$

$$\Delta Y < Y \frac{\Delta X}{X}$$

$$X \Delta Y < Y \Delta X$$

$$X \frac{\Delta Y}{\Delta X} < Y$$

Starting with A-1 which states this condition, we can multiply by Y and obtain A-2. Now by multiplying by X we obtain A-3 and by dividing by ΔX we obtain A-4. Therefore, we have proven that under constant returns (A-1) the quantity of the factor multiplied by its marginal product just exhausts (is equal to) the total product (A-4). Situation B, shows that under increasing returns (B-1) the procedure “more than” exhausts the total product (B-4). The opposite case is illustrated for decreasing returns in situation C.

(whether the quantities measured are in value or physical terms). Measurement of the production function is of interest not only because it shows the factor-product transformation ratio but also because it provides the basis for deriving cost functions or curves, substitution rates between factors, elasticities of production and other quantities of interest in economic analysis.

Production Functions for Technical Units

The production function (input-output relationship) for any production process is of the general form $Y = f(X_1, X_2, X_3, X_4 \dots X_n)$ where Y is the product and the X 's are the resources all of which can be varied. When the input-output relationship is to be estimated for a single variable resource such as fertilizer (or fertilizer and the resources which serve as direct technical complements) the "short-run production function takes the form of $Y = f(X_1 | X_2, X_3, X_4 \dots X_n)$ where X_1 (fertilizer) is variable and all other resources are fixed in quantity (or while other resources are fixed in quantity, their services may be present in quantities or flow at a rate which does not cause them to limit the productivity of the variable resource). The relationship of single factor input as related to output can be estimated from experimental data (or a farm sample if sufficient stratification detail can be incorporated into the sample). When the single-factor function is derived from an experiment, the statistical procedure should be those which parallel the relationships to be derived. Rather than from conventional experimental designs which employ a very few levels of fertilizer replicated several times, regression estimates can be made better if more levels of application are used, each one applied singularly and with extreme ranges included. Conventional procedures revolve around replication to compare "between" and "within" variance for different levels of fertilization as "discrete practices." The production economist's interest, however, is with the variance only in the sense of the standard error of estimate for the regression coefficient, a functional relationship where the rate at which variable resources are used is one of degree. The custom of the biologist is to compute a "least significant difference" and then discard data of a smaller magnitude. This procedure often results in the discarding of important product increments at the extremes of the data (and which, in a regression sense, are just "as significant" as those in the middle of the distribution).

Numerous algebraic functions can be used in estimating input-output relationships. One is the Spillman production function of the nature $Y = m - ar^x$. It assumes that elasticity of production changes but that the ratio of marginal products

$$\left(\frac{\Delta_2 Y}{\Delta_1 Y} = \frac{\Delta_3 Y}{\Delta_2 Y} \cdots \frac{\Delta_n Y}{\Delta_{n-1} Y} \right)$$

where the ΔY 's refer to the changes in output forthcoming from each input unit represented by the subscripts) is constant over all ranges of input. Another is the Cobb-Douglas of the form $Y = aX^b$. It does not assume equal marginal product ratios but does assume the elasticity of production

$$\left(\frac{\Delta_1 Y}{Y} \bigg/ \frac{\Delta_1 X}{X} = \frac{\Delta_2 Y}{Y} \bigg/ \frac{\Delta_2 X}{X} = \cdots = \frac{\Delta_n Y}{Y} \bigg/ \frac{\Delta_n X}{X} \right)$$

where the Δ 's refer to the successive increments in input and output, while X and Y refer to total inputs and outputs) to be constant over all ranges. Neither function allows a negative marginal product. None of the assumptions outlined has universal application in agriculture and the problem is one of finding the function which is most appropriate in terms of the logic, known technical conditions and estimational costs, and the degree of predictional error involved. Since it assumes neither constant elasticity nor constant marginal product ratios, a simple polynomial equation with a squared term such as $Y = a + bX - cX^2$ can serve satisfactorily in many instances. It also allows diminishing total productivity (negative marginal productivity) as well as more direct statistical tests of diminishing versus constant returns.

For problems in livestock feeding, and perhaps even for problems of fertilization, the technical unit production function usually should be estimated in the form, $Y = f(X_1, X_2 | X_3, X_4 \dots X_n)$ or $Y = f(X_1, X_2, X_3 | X_4 \dots X_n)$ since one feed can seldom be varied while others are held constant. Even if one feed is increased by itself, it must replace another within the limited capacity of an animal's stomach. These input-output relationships can be estimated best through physical experiments conducted cooperatively by production economists and biological scientists. We have experiments of this nature under way which include (a) two elements, nitrogen and phosphate, in relation to crop production; (b) forage and grain in relation to milk production; (c) forage, grain, and protein in relation to beef production; and (d) grain, protein, and antibiotics in pork production. Our physical scientists are highly enthusiastic about incorporating models from production economics into their experimental designs. The experiment in pork production, for example, was set up to estimate a production surface with protein rations representing different "vertical slices" through it. From this data we have derived total product, marginal product, and product isoquant equations shown below for Cobb-Douglas and quadratic functions when aureomycin is included in the ration:

1. Production Functions (Y = gain, P = protein, C = corn)

$$a. Y = 1.36P^{.2014} C^{.6303}$$

$$b. Y = .46P - .32C - .00092P^2 - .00013C^2 - .00011PC - 2.03$$

2. Marginal Products of Corn

$$a. \frac{\partial Y}{\partial C} = .857P^{.2014} C^{.370}$$

$$b. \frac{\partial Y}{\partial C} = .32 - .00026C - .00011P$$

3. Iso-Product Contours

$$a. C = \left(\frac{Y}{1.36P^{.2014}} \right)^{\frac{1}{.6303}}$$

$$b. C = \frac{-(.3243 - .00011P \pm \sqrt{.106 - .0002P - .00000046P - .00052Y})}{-.00026}$$

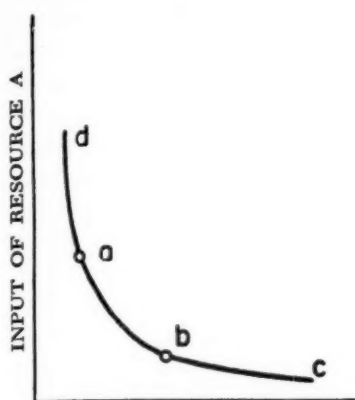
In Table 1, we present data from a three-factor production function for choice yearling steers. While we have derived only iso-product, feed combinations and marginal substitution rates between feeds, we also could derive simple input-output ratios for one feed with others held constant at different levels. The figures in parentheses represent the "average" rate of substitution between grain-hay combinations; those underlined represent "average" substitution rates between grain-protein combinations.

As in the case of single-factor production functions, data to be derived from experimental data for several resources often calls for a departure from the conventional procedures of the biologist. Rather than a few

TABLE 1. THREE-VARIABLE PRODUCTION FUNCTION FROM EXPERIMENTAL DATA.
FEED QUANTITIES IN PRODUCING 300-POUND GAIN
ON CHOICE YEARLING STEERS

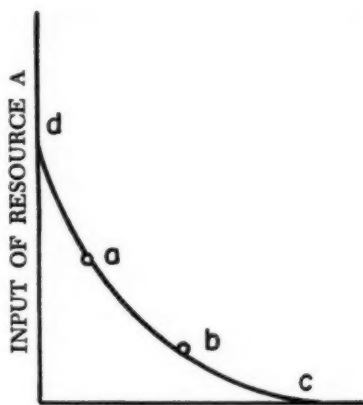
Pounds of Hay	Pounds of Grain with 150 Pounds Protein	Q_0	Pounds of Grain with 300 Pounds Protein	Q_0	Pounds of Grain with 450 Pounds Protein
500	2061 (223)	352	1709 (185)	277	1532 (156)
1000	1838 (120)	314	1524 (99)	158	1366 (89)
1500	1718 (79)	293	1425 (66)	148	1277 (59)
2000	1639 (60)	280	1359 (50)	141	1218 (44)
2500	1579	270	1309	135	1174

Source: Derived from experimental data of Iowa State College from the production function $Y = 2.20 G^{.490} H^{.081} P^{.135}$, where Y is beef production in pounds while G , H and P refer respectively to grain, hay and protein per steer. Substitution rates are averages between feed combinations.



INPUT RESOURCE B

FIG. 1



INPUT RESOURCE B

FIG. 2

"treatments" duplicated several times, many singular points should be estimated on the production surface. Again interest is not with "discrete practices" and "within" versus "between" variance but with functional relationships and the standard error of the regression coefficient.

The problem of the appropriate algebraic function for multiple-factor input-output relationships parallels the problem for single factors but is more complex. Choice must rest on the relevant economic logic in relation to the funds available for computation and the purposes and extremes over which the predictions will apply. Possibilities again include the Cobb-Douglas or a quadratic with or without a cross-product term. In both functions the marginal productivity of one factor depends on the input of other factors, but the marginal rates of substitution in the Cobb-Douglas do not depend on the level of product output or the input of other resources. Product contours under the Cobb-Douglas equation become asymptotic to the axes as in Figure 1 and, therefore, may best apply to pairs of factors which serve as substitutes within one range but as technical complements for extreme ranges. The quadratic function allows the product contours to intersect the axes as in Figure 2 and, therefore, may best serve where resources are complete substitutes. The two functions may give similar estimates for factor combinations over an intermediate range such as *ab*. However, they will give widely different estimates for extreme ranges such as *ad* or *bc*.

Production Functions for Farms

Estimation of productivity relationships for farms involves added complexities. Ordinarily upwards of four or five categories of resource inputs are involved. Perhaps no single function adequately describes the relation-

ships between factors and products within a farm. The two relatively simple functions outlined above can be employed for intra-farm estimates of input-output relationships. While they are simple relative to the production process as it actually exists, they become cumbersome when the numbers of variables become large. A Cobb-Douglas equation automatically (a) allows diminishing productivity of each resource and (b) causes the productivity of one resource to be dependent on the magnitude of others. If these conditions are incorporated into a quadratic equation, it should include linear, squared, and cross-product terms for each factor. With six factors, six regression coefficients must be estimated for a Cobb-Douglas; 27 must be estimated for a quadratic. With limited funds, we may be forced to use a Cobb-Douglas function even though it does not conform to logic as well as a quadratic or other equation.

For estimation of the intra-farm production function, a carefully designed and stratified sample should be employed. The population or strata selected for sampling, if the estimates are to have meaning, should not include a group of farms heterogeneous in respect to soil types, techniques employed and products produced; the estimates are likely to be "hybrids" or "mongrels" with application to no particular situation. We have completed at least squares production function for a group of 70 farms all with the same acreage, the same soils (agronomists mapped the farms) and producing the same general combination of products. The crop and livestock production functions derived for this sample are indicated as 1 and 2 below where Y_c and Y_l refer to value of crop and livestock output while L refers to labor, C refers to crop services, M refers to machine services, F refers to fertilizer, S refers to aggregate feed, building and livestock services.

$$(1) Y_c = 14.8 L^{.333} C^{.384} M^{.149} F^{.069}$$

$$(2) Y_l = 3.48 L^{.251} S^{.684}$$

Some relevant input-output relationships are estimated in Table 2 for the first function. All coefficients are significant at the five per cent level

TABLE 2. DERIVED MARGINAL VALUE PRODUCTS OF LABOR USED ON LIVESTOCK, 160-ACRE FARMS ON MARSHALL SOILS WITH CAPITAL AT DIFFERENT LEVELS

Months of Labor	Marginal Product of Labor in Dollars with Capital Inputs		
	Equal to Average of All Farms	One-half the Average for All Farms	50 Per cent Greater Than the Average for All Farms
4	376	248	425
6	333	219	384
8	301	199	352
10	275	182	325
12	190	186	283

of probability. The figures show derived labor productivities with the input of livestock, feed and buildings constant at different levels. As would be expected from the function, labor productivity is low when the capital input is low but remains at a high level when capital input also is increased. Starting with an average amount of capital and four months of labor, productivity declines as more labor is added to the same capital. However, with 50 per cent more capital, the productivity of ten months of labor is as great as the six months used with an average amount of capital. The algebraic function used does, then, conform to certain of our logic and hypotheses. This does not mean, however, that it is the most efficient function or that it adequately describes the complex production relationships involved.

An even more complex problem than that of the sample, measurement, and aggregation of inputs or the particular algebraic function to be employed is the question of the appropriate estimational procedure. We have outlined single equation (least squares) procedures thus far. For intra-farm functions, however, we should consider a second alternative; namely that of simultaneous equations. Within a farm, the quantities, timing and kinds of resource inputs are decided by the entrepreneur and not the research worker. Managerial decisions are determined simultaneously by a system of structural (functional) relationships of which the production function is only one and the estimational procedure may be set up accordingly. Much effort must be devoted to specification of the equations or models necessary for this estimational procedure. Although we are interested in the production function (input-output ratios), estimation of the other functions or relationships may be of extreme importance in isolating a non-hybrid production function. Because of time limitations we lay aside this problem of deriving input-output relationships. (We will present multiple-equation coefficients for the sample discussed above at a later time.)

Linear Relationships and Discrete Phenomena

Many intra-farm input-output relationships are simple and can be estimated with simple procedures. A large number of relationships within the farm are linear, denoting constant productivity of factors. Typical farms in the United States have enough labor, machine, and building services so that variable resource services can be increased over a fixed but divisible plant and realize, for all practical purposes, a constant output for each constant increment of input. The Corn Belt farmer with 60 acres of corn, if he grows only one acre of corn on his divisible tract, may obtain 50 bushels on one acre with input of a given quantity (X) and combination of seed, tractor fuel, and fertilizer. If he grows 10 acres he may obtain

a yield of 500 bushels with input of 10X of "variable" services; 60 acres may produce 3,000 bushels with an input of 60X. The bundle of variable resources has constant productivity as long as "surplus capacity" exists in the given (but divisible) stock of labor, machine, land, and buildings.⁴

Where relationships are linear in this manner, estimates of the ratios can be obtained by surveys summarized to give a single average. Assuming that the sample includes a single production function in respect to soil type and techniques, the research worker can make a survey of seed, fertilizer, and tractor fuel used per acre. Along with knowledge of yield per acre, these figures can be used to estimate the linear input-output coefficient which exists within the confines of a given (but divisible) set of labor, machine, building, and land services. Or, these constant ratios can be obtained as estimates from physical scientists. Data used in budgeting typically assume a linear production function and therefore are subject to the considerations outlined above.

Regional Estimates and Aggregative Data

Productivity coefficients for agricultural regions or nations could be based on samples and functions of the type outlined above. However, limited funds cause these estimates to be made from aggregative data such as the census. Estimates of this nature (i.e. those by Clark, Schultz, and Christensen) have been simple arithmetic averages for particular resources or groups of resources.⁵ These estimates of intra-regional resource productivity (and the inter-regional comparisons which ordinarily accompany them) are made to suggest how resources might be arranged to result in a maximum economic product. If the average product is low in one region relative to the second, it is assumed that resources should be moved from the former to the latter. It is, of course, marginal rather than average productivities which provide the basis for an optimum allocation of resources. Situations do exist where the rank of marginal products for two producing units or regions may be the opposite of the rank for average products.

Since estimates of the nature under discussion refer to average productivity only (the total product imputed to the factor is divided by the total inputs), they provide the basis for marginal analysis only if the production function is linear. Under constant returns the average product curve, if

⁴ As soon as one of the latter resources becomes engaged to its "first capacity" however, the "variable" seed, fertilizer, and tractor fuel may take on diminishing productivity as more acres are engaged in production.

⁵ The procedures of Clark and Schultz in computing labor returns parallel those employed originally by G. F. Warren. However, Warren introduced refinement to the extent of imputing a share of the product to capital while the latter workers imputed the whole amount to labor.

it originates at zero, is constant and equal to the marginal product. Hence if we were certain that constant returns were to prevail as more or fewer resources are applied to a given region, we need only estimate the average product; it is identical with the marginal product.

Other Assumptions in Productivity Analysis

Average products can be used to estimate marginal products for non-linear production functions, however, if certain conditions hold true in respect to the nature of the average function (and sufficient information is available). The system of estimation can be applied in simple fashion when the average and hence the marginal productivity curve is of a straight-line nature. A situation of this nature is illustrated in Figures 3 and 4 where both the average (A) and marginal (M) product curves are linear. The decline in the marginal product is twice the absolute decline in the average product. A corollary condition is this: Inputs defining equal

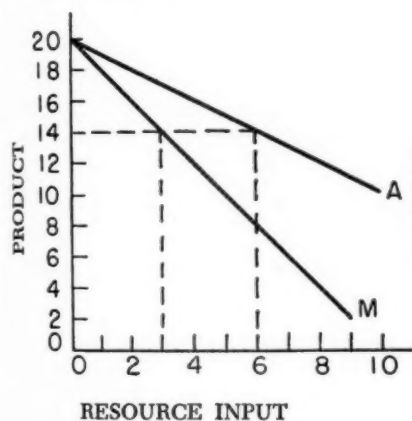


FIG. 3

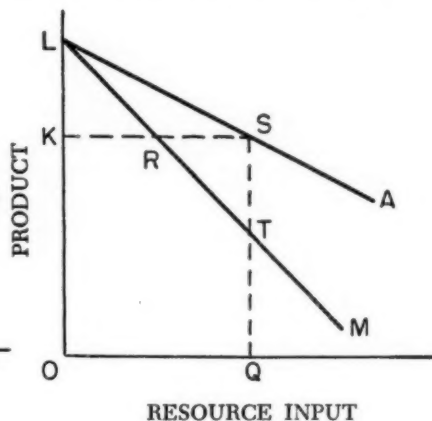


FIG. 4

magnitudes of average and marginal products are twice as great for the former as for the latter. In Figure 3, an average product of 14 is forthcoming with six units of resources; a marginal product of 14 if forthcoming with three units of input. This geometrical relationship, which exists for every point on the curves, is illustrated further in Figure 4, where the length of KR is one-half of KS; KR also is equal to RS.⁶

⁶A more detailed geometrical proof of this proposition is given by Robinson (*Economics of Imperfect Competition*, Macmillan, London, 1950, p. 30). We wish to prove that KR equals RS and can proceed as follows: The area KSQO is equal to the area LTQO since both quantities define the total product when OQ units of resources are employed. Hence area LKR = area RST. Both angles LKR and RST are right angles and the two angles LRK and SRT are equal. Therefore KR = RS since triangles LKR and RST are equal in all respects.

If measurement is made of average resource productivity from census aggregates, we know only that the total value product of the region is $KSQO$ and the quantity of resources employed is OQ . The average product, computed by simple arithmetic, is QS . Can we say anything about the marginal product? Assuming a linear average product curve, we can say only that a marginal product equal to QS is forthcoming when the region employs an amount of resources equal to $.5OQ$. We can say no more since we know nothing about the slope of the average product curve. However, if we can obtain estimates of two points on the average product curve, i.e. if the region can be broken down into two groups of farms using different quantities of resources, the slope of the average curve and hence the marginal product curve can be derived. Use of a system such as this, even where the average curve is not linear, would give better estimates of marginal productivity than does the system which assumes that differences in marginal products are of the same order as differences in average products.

Breakdown of census data by economic classes of farms thus may allow us to make estimates of marginal resources productivities from aggregate figures for agricultural regions. Since farms in these different classes use different quantities and proportions of resources, we can compute the average product for any two economic classes. Then, if we are willing to say that the assumption of linear average and marginal product functions between any two groups of farms provides enough refinement for the recommendations to be based on the estimates, we can derive corresponding marginal quantities.

THEORIES AND TECHNIQUES IN AGGREGATIVE ANALYSIS IN FARM MANAGEMENT

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TRADITIONALLY, the object of research in farm management has been to improve the organization and operation of farms. This calls for analysis of the production situation on individual farms. But with the use of farm management research to effect general changes in farming, in extension and farm production programs, and with the growing commercialization of agriculture, it is likewise apparent that analyses of the over-all aspects are needed. Thus, for example, we may want to know how productivity in cotton farming has changed; how, say, farm incomes in the Piedmont compare with incomes in other areas and occupations; or, what the implications of changes in farming in an area might be on occupational adjustments, land resources, prices of farm products, or on marketing facilities. These represent what we commonly think of as aggregative aspects of research in farm management.

Aggregative analysis enables us to group under a few simple headings an extremely wide range of economic phenomena. It is useful to farm management workers from two standpoints. (1) It provides a means of appraising the common features in the production situation for a particular group of farms and the broad differences in the production situation as between one group and other parts of agriculture or the economy. Such analysis complements individual farm research in analyses of farm policy alternatives and of individual farm adjustments. (2) It enables study of the implications of production changes in a particular part of agriculture on their production costs and values and the effects of such changes on other parts of the economy. Conversely, it enables studies of the effects of changes in other parts of agriculture, or in the general economy, on particular segments of agriculture. Of particular interest to farm management workers in this context are the possibilities of complementing adjustment studies at the level of the firm with analyses of the repercussions. We have learned that what is true for the individual may not be true for the group.

In recent years the term "aggregative analysis" has been frequently used to characterize research that uses highly simplified economic models and deals with such national problems as employment, prices, and income. In my judgment, this interpretation of aggregative analysis is much too limited. As Leontief recently observed in discussing aggregative analysis, "The practical choice is not between aggregation and non-aggregation but rather between a higher and a lower degree of aggregation. . . . The question of aggregation represents essentially a special aspect of the more

general problem of the classification of industries and of relevant distinction between different sectors of the national economy in general."¹

Problems in Aggregation

The theoretical basis for aggregation is important in making useful aggregative analyses. Meaningful aggregation represents the process of putting like things together to form a whole.

In individual farm analyses, account can be taken of the individual resources and technological conditions of the firm. But, because of the detailed nature of the data, little perspective is provided as to how the current or prospective level of resource productivity in one sector compares with that of other sectors, or the over-all consequences of the suggested changes in resources and products. In aggregative analyses, the common features in the production situation can be explored and major attention can be centered on the secondary effects of changes in inputs and output. Such analyses, however, assume conditions of homogeneity within the groups of firms, resources, and products.

In aggregative analysis, consequently, the research worker continually weighs the convenience of aggregation at a higher level against the loss of relevant detail. Details are significant when they represent differences in economic attributes. If the details measure similar economic attributes, they can be combined. From the standpoint of the economist, the economic attributes can be conveniently grouped into three categories: products, factors, and firms.

A basis for determining relatively similar or homogeneous products is found in the principle of substitution, as implied in the statement of Hicks that "... if the prices of a group of goods change in the same proportion, that group of goods behaves just as if it were a single commodity."² The requirements of such a condition are a high degree of substitutability.

Similarly, the inputs that can be grouped together would include, under static equilibrium conditions, those inputs that are close substitutes. To these may be added those inputs that are used in fixed proportions or are complements.

Following this line of reasoning, a reasonable concept of homogeneous firms in a static framework can be developed. If the products and factors of a group of firms are the same, close substitutes, or highly complementary, the group of firms may be considered to be homogeneous.

Consideration of the technological conditions as a variable, however,

¹ W. W. Leontief, "Input and Output Economics and Its Use in Peace and War Economics," *American Economic Review*, May, 1949, p. 216.

² J. R. Hicks, *Value and Capital*, p. 313. See also Robert Triffin, *Monopolistic Competition and General Equilibrium Theory*, Chaps. II and III, for a discussion of classifying commodities, factors, and firms.

leads to further complications. For example, in the case of factor inputs, the prices of factors often do not reflect differences in productivity because of imperfect knowledge and impediments to their mobility. Prices of horses and tractors, for example, still may not reflect differences in productivity in many areas. Such factors should not be combined even though they are substitutes. Indivisibility of key items of machinery or equipment, as well as other aspects of scale, are of major importance in a dynamic economy. As scale influences the substitutability of resources and the efficiency of production, it becomes a major variable for consideration in aggregating individual firms into homogeneous groups.

Visualizing large groups of firms, products, or factors that fulfill the requirements for homogeneity from an economic standpoint is somewhat difficult. Fortunately, the degree of homogeneity is important only insofar as variations in such aspects are important to the problem at hand. While the conditions are so strict as to rule out almost any conceivable level of aggregation for all purposes, they can be highly useful in making judgments regarding the limits of aggregation for specific problems.

Two general implications of this brief discussion should be emphasized. As we move into aggregative analysis, we need to *clarify* and *develop* our theory or our scheme of cause and effect relationships with respect to the problem under investigation. Close relation of the aggregation process to the purpose of the analysis is a fundamental need. The quest for a universal system of aggregation or classification that can be used for all purposes would appear to be doomed to disappointment. Consequently, variety in systems of aggregation should be sought rather than discouraged. The purpose of such aggregates, however, needs to be defined. In studying adjustment opportunities, for example, the aggregates needed would differ from those necessary for a study of current levels of productivity. In the second place, more consideration of underlying principles is needed in preparing aggregates. Similarity from a physical or statistical rather than from an economic standpoint frequently is used as a basis for groupings.

Differences between production functions of firms and of commonly used aggregates represent another problem in aggregation that has recently disturbed economists.³ Aggregates, such as total farm output or farm production, commonly exclude inter-farm transactions. Consequently, the commonly used totals are somewhat less than the totals of individual farms.

³ Lawrence R. Klein, "Macroeconomics and the Theory of Rational Behavior," *Econometrica*, April, 1946; *Idem.*, "Remarks on Theory of Aggregation," *ibid.*, October, 1946; Kenneth May, "The Aggregation Problem for a One Industry Model," *ibid.*, October, 1946; Kenneth May, "Technological Change and Aggregation," *ibid.*, January, 1947.

The logic of these aggregates is identical to the logic that caused farm accountants dealing with individual farms to consider only the final sales and expenses of the firm rather than to account for the total production and expenses of each enterprise. The Leontief input-output system resolves this conflict by including inter-industry sales and expenses as a separate cell in the industry total. This enables analysis of resources used and product added from the standpoint of both the firms and the group.

Analysis of Economic Structure of Agriculture⁴

Appraisal of the over-all production situation for various groups of farms represents one of the important purposes of aggregative analysis. Even after a half century of research in agricultural economics, we know relatively little about the variations in levels of productivity in the various segments of agriculture of the United States, the extent to which problems have tended to persist, or the extent to which there are common facets to the problems. Such information is of basic importance in designing extension and action programs from the standpoint of both the type of program and the groups that need assistance. In research procedure, lack of such information may also have important effects. Too much time may be spent, for example, in analyzing farm alternatives and too little time on the off-farm alternatives. Over-all analyses in this general area can be conveniently separated into two closely related types: (1) Studies appraising production conditions and resource productivity among sectors of agriculture at a point of time, and (2) studies that evaluate production changes through time.

Classical equilibrium theory relating to firms and industries furnishes a theoretical basis for studies analyzing the production characteristics of the important sectors of agriculture. Most of these studies are oriented around the basic theory that production will be maximized if the values of products in marginal uses are equal. In a broad, over-all setting, a particular group of firms or a commodity may be considered as a marginal use of resources. Substantial differences in resource productivity among such groups indicate a need for the development and encouragement of alternatives.

Assuming a balance in productivity levels in some past time, failure to make comparable progress indicates problems. Analysis of changes also

⁴ For illustrations of studies of this type see: "Progress of Farm Mechanization," by M. R. Cooper, Glen T. Barton, and Albert P. Brodell, U.S.D.A. Miscellaneous Publication 630, 1947; *Forward Prices for Agriculture*, by D. Gale Johnson, University of Chicago Press; "Gains in Productivity of Farm Labor," by Reuben W. Hecht and Glen T. Barton, U.S.D.A. Technical Bulletin 1020; "Sizes of Farms," by K. L. Bachman and R. W. Jones, U.S.D.A. Technical Bulletin 1019; "Resource Productivity in Iowa Farming," by Earl O. Heady and Earl R. Swanson, Research Bulletin 388, June, 1952, Iowa State College.

involves theories of economic development. It appraises, for example, the extent to which innovations or technological advancements have been introduced in the various sectors of agriculture, and the effects on levels of productivity.

Theories of the Keynesian type have applicability to many of these problems. The increasing propensity to consume among lower-income groups, for example, may partially explain the chronic failure of many low-production farmers to make the necessary capital investments to progress as rapidly as other parts of agriculture.

In considering the use of techniques and theories in aggregative analysis, the nature of their use must be appreciated. Individual firm analysis has sometimes been characterized as learning more and more about less and less. Over-all analyses by the same token have to accept the stigma of learning somewhat less about somewhat more. Simplification of theories and techniques often represents one of the costs of broad coverage.

Several simple techniques for measuring resource productivity have been used. The simplest of these includes such things as economic classes of farms and gross production per worker. Such simplified measures give a reliable index of differences in productivity per unit of *all* resources provided the quantity of resource services other than labor per unit of product is relatively fixed or the variation is not large enough to materially affect conclusions. When dealing with situations involving different combinations of capital and labor, this relationship frequently implies the approximate balance of offsetting tendencies. As farms use more capital, the return per unit of capital may be expected to decline, but this will not follow if these farms add capital that improves the technology. Surprisingly, perhaps, this offsetting tendency frequently seems to exist. For example, by economic class of farms the capital and expenses per unit of product do not vary greatly.⁵

When returns per unit of capital vary significantly, or the amount of product attributable to particular factors is desired, some account must be taken of specific resources. The residual and regression techniques remain as the primary tools.

Sometimes production economists attempt to suggest clear-cut solutions on the basis of aggregative analysis. One approach has been to draw implications from empirically estimated marginal productivity functions relative to changes needed in capital-labor combinations. This is based on established marginal productivity theory, but close attention must be paid to the assumptions of marginal productivity theory. Most important, perhaps, is the assumption of a static economy. Changes in technology have

⁵ "Major Areas of Low Production Farms and Levels of Productivity," by J. V. McElveen and K. L. Bachman, B.A.E. (In process of publication.)

been a prime influence in efficiency of production in agriculture. It enables more to be produced with the same or even less resources. As Earl Heady points out, "... a distinct and likely possibility is that should less labor be employed in agriculture, less total capital would be required."⁶ A combination of analyses at the levels of the firm and the aggregate is needed to analyze farm adjustment opportunities.

The meaning of accepted measures of production through time also deserves consideration. The statistically feasible concept of production in this context is physical rather than economic. This means that a bushel of wheat receives the same value regardless of changes in production or in demand. For some purposes, we are interested in physical measures of change in output or we can assume a close relation between the physical volume and the economic value. But, from some aspects, a major limitation of work in this area is centered around the valuation of production. The general theory of value presumes value to be related to the quantity produced. Thus, from an economic standpoint, a bushel of wheat may not always represent the same amount of production.

Inter-Relationships Among Sectors⁷

Changes in industry vitally affect the decisions, efficiency, and incomes in agriculture. A sharp change in industrial activity, for example, would change considerably production returns in agriculture and the opportunities for occupational adjustments. Similarly, production adjustments made in parts of agriculture have important effects on other sectors and on the value of their own production. Increased cotton production in Western irrigated areas, for example, materially affects production conditions in parts of the South. General equilibrium theory, which seeks to explain how changes in one part of our economy are affected by changes in other parts, provides the logical basis for these studies.

For some problems and some types of questions, aggregative analysis alone can provide useful information. Thus, for example, we may wish to know how shifts in industrial activity affect farmers' decisions relative to investment and adopting new technologies. Or we may wish to explore the effect of a change in consumer income on the net income in major types of farming.

For other situations, a combination of firm and over-all analysis is

⁶E. O. Heady, "Implications of Particular Economics," *This Journal*, November, 1949, Part 2, p. 847.

⁷For illustrations of studies in this general field see: "Farm Price Gyration and Aggregative Hypothesis," W. W. Cochrane, *This Journal*, May, 1947; "Efficient Use of Food Resources in United States," by Raymond P. Christensen, Technical Bulletin 948, 1948; "The Nature of the Supply Function for Agriculture Products," by D. Gale Johnson, *American Economic Review*, September, 1950; *Interregional Competition*, by R. L. Mighell and J. D. Black, Harvard University Press, Cambridge, Mass., 1951.

needed. Farm management workers probably have been more keenly aware of the limitations of aggregate techniques in analyzing production alternatives than industrial and general economists. Without a close study of individual farms, the alternative opportunities and the nature of new factor combinations are often not known. Encouragement of livestock production, for example, on the basis of over-all relationships might seem likely to decrease both output and input, but a closer analysis of individual firms may suggest a considerable increase in output without materially changing total inputs.

On the other hand, considerable effort may be expended on lines of activity that appear attractive from analysis of individual firms but that are of questionable value when secondary effects are considered. Not only is the extent of change recommended likely to be in error, but also the direction of changes. Instead of greater production of a commodity that has an inelastic demand, the desirable suggestion may involve a decrease in production of the inelastic commodity and encouragement of transfers of resources to production of other commodities, or of labor to other occupations. The secondary effects of changes in quantities produced and factors employed must be disregarded at the level of the firm. At the level of the group, they can be given primary consideration.

These two levels of analysis consequently are not separate but are interdependent. Each is part of a comprehensive process of analysis. As yet, only limited progress has been made in developing research procedures that permit cross reference of these two levels of analysis. But the need has been increasingly felt, and attempts to develop research of this type have become more frequent.

The 1946 study of "An Efficient Agriculture in the Cotton Belt" illustrates the usefulness of over-all analysis of this type in complementing analysis of individual firms.⁸ A feature of that study was the introduction of a formal process of successive approximations in the analysis of the desirable production adjustments on individual farms consistent with inter-relationships between Southern agriculture and the United States economy.

Similarly, in studying the adjustment opportunities of an area, considerable attention often needs to be paid to whether the alternative lines of adjustment are consistent with land resources, market outlets, and other conditions that have been assumed in the firm analysis. If these assumptions are not satisfied, attention needs to be directed to possible changes in the marketing structure and in the production adjustments recommended.

⁸"Study of Agricultural and Economic Problems of the Cotton Belt," Hearings before Subcommittee on Cotton, Committee on Agriculture, 80th Congress, First Session, July 7, 8, 1947, pp. 6-66.

Improved techniques are needed to deal with many of these aggregative aspects of farm management research. For general problems of inter-relationship among sectors in agriculture and our economy, perhaps production economists should give more consideration to the input-output or "inter-industry" technique recently developed by Leontief.⁹ This technique is designed to facilitate the estimation in a general interdependence setting of the effects of changes in the national output on the output and requirements of the various sectors. Similarly, given a bill of final output, it facilitates estimates of the effect of changes in physical inputs and outputs in a particular sector on the inputs and outputs of other sectors. It might conceivably be used, for example, to approximate the effect of specified shifts in consumers' demand on land and labor requirements or on incomes for various specific enterprises and regions.¹⁰

Other needs for new techniques are reflected in the recent study of "Agriculture's Capacity to Produce."¹¹ When price estimates were established, certain quantities of production of cotton, wheat, etc. were assumed. Actually, in some cases considerably different quantities were indicated as feasible, implying a revision in prices and a change in the balance among commodities. Also, it is foreseeable that a situation might arise in which estimates under modified assumptions might be highly useful.

In both area and national studies, a need exists for developing procedures to simplify the process of achieving a "final" balance in production and also for estimating modifications in production capacity consistent with changes in economic conditions. As changes in conditions would be reflected in changes in prices, the development and use of information regarding substitution rates among production alternatives in the various areas might be an important tool. Additional possibilities may be opened up by "linear programming" techniques. Use of this technique would imply a somewhat different approach from the use of substitution rates.¹²

⁹ See *The Structure of the American Economy 1919-29*, by W. W. Leontief, Harvard University Press, 1941, Cambridge, Mass. Also, "Input-Output Economics," *Scientific American*, October, 1951.

¹⁰ Important problems, however, would need to be faced in adapting the input-output technique to analyses of agriculture production. For example, in its common form the technique assumes fixed production coefficients. Obviously the assumptions do not fit the conditions with respect to land and labor for groups of farms in agriculture. Where the approach is by commodities and for exploring changes in production among commodities, these particular assumptions may have more validity.

¹¹ "Agriculture's Capacity to Produce," U.S.D.A. Agriculture Information Bulletin No. 88, 1952.

¹² For example, given the changes in commodities needed, the commodity composition of the changes represented by the production alternatives in the various areas, and the "cost" of these changes, it might be possible to approximate the nature of the adjustments needed to develop with least cost the adjustments desired. Linear pro-

Concluding Comments

Farm management workers have made outstanding contributions to the theories and techniques relating to analyses at the level of the firm. Perhaps we need now to put somewhat more emphasis on developing further our theories and techniques relating to the broader over-all aspects. Theories and techniques useful in aggregative analysis can be viewed as an extension of the logic of firm analysis. While some new theories and techniques are involved, the research complements rather than replaces analysis at the level of the firm.

DISCUSSION

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As has been pointed out by Dr. Bachman, the terms micro or particular, macro or aggregative, are relative terms. What has been termed the aggregation problem always involves a compromise between ability to manage large numbers of variables and loss of relevant detail. The seriousness of the aggregation problem depends upon the (1) level of aggregation, (2) purpose of the study, and (3) desired precision of the recommendations to be based upon these research findings.

Thus, input-output relationships of a purely technical nature (for example the yield response of corn to different levels of ammonium nitrate application) present little if any problem of aggregation. However, when we attempt to isolate production coefficients or input-output relationships on a farm basis, as discussed in Dr. Heady's paper, the aggregation problem is quite complex. If the number of variables is to be kept within manageable proportions, different kinds of livestock, machinery, equipment, land, and labor must be aggregated into nearly homogeneous units. Thus new tractors and old tractors, new and old combines, cornpickers, balers, cultivators, and wagons are usually aggregated into one category of inputs. These machines usually are aggregated on a value basis. Thus several questions arise. Will a combine valued at \$1,500 have the same effect on production as a field forage harvester of the same dollar value? Will an older tractor bought on a 10 per cent lower price level and depreciated to 80 per cent of its purchase price have 30 per cent lower productivity than a new tractor? Is it better to put the same value on all machines, regardless of age, which are capable of doing the same job? Or would it be better to use the annual service cost, either in terms of depreciation or rental rates, as a means of aggregation within all categories of inputs? How, as in the project presented in Dr. Heady's paper, do you get accurate data on the division of labor between crops and livestock? How is it possible to determine either the annual use value or sales value of the buildings independent of the farm land?

gramming is closely related to inter-industry analysis, but its primary use has been in choosing production alternatives rather than in making estimates. Like the inter-industry technique, it commonly assumes fixed production coefficients and is greatly facilitated by the use of recently developed high-speed computing machines.

Such are the questions to be answered before an aggregation procedure is decided upon. It must be recognized, however, that this aggregation problem is not unique to this particular type of analysis. Those of us who have the familiar factors affecting profit studies at our experiment stations commonly ignore this problem by aggregating all livestock together with all kinds of land, machinery, and equipment. We then charge against this heterogeneous aggregate an interest rate of say, five per cent in calculating a labor earnings figure which we use as a measure of operating efficiency.

While Heady did not explicitly state the use to be made of his farm production coefficients, he seemed to imply that they would be used to make recommendations to farmers on the effect of possible changes in their farm organizations. I am not criticizing the idea of estimating whole farm production coefficients, but I do not visualize that our techniques for isolation and aggregation into homogeneous categories are sufficiently developed to warrant the use of such a procedure for the purpose of making intra-firm recommendations. This is particularly true when recognition is given to the mixture of new and old technologies which exist within the agricultural industry and when these differences in technologies are associated with differences in scale as measured by output. Thus, it is quite possible that the production relationship isolated is not the true relationship but is a "hybrid" resulting from the observation of points on successively higher production functions. Hence, it would appear that the estimated production coefficient might overestimate the effect on production of an expansion in any particular category of resources. Furthermore, as has been pointed out, such a function is necessarily an inter-firm production function and does not necessarily describe conditions for any one farm but for an "average of farms."

This should not be taken to suggest that whole farm production functions are of little value. It does suggest that before recommendations can be made as to the effects of increases in the amount of livestock or any other aggregated category of resources, a more detailed study should be made than can be possible at this level of aggregation. Such a study can be made at the level of the purely technical input-output relationship. Thus it appears that whole farm production coefficients have their greatest usefulness in identifying in what particular areas the isolation of technical input-output relationships would be most fruitful. In this way, I believe, the factors affecting profit studies and whole farm production functions are quite similar. Neither, in my opinion, provide an adequate basis for recommending intra-firm adjustments and for predicting the effects of these adjustments. Factors affecting profit studies were not designed to tell one precisely what should be done to increase farm income. They can only indicate a general area which might be the cause of low income. Both factors affecting profit and whole farm production function studies require data from studies of technical input-output relationships in order to form a truly effective extension program in farm management.

Research and extension workers who find that factors affecting profit studies are useful also will find farm or enterprise production coefficients of great value in their work. The major difference between these two techniques is that whole farm production coefficients involve greater attention to sampling procedures, more precise statistical techniques, and a greater attempt to segregate resources into more homogeneous units so that the effect of a change in one variable is not confounded with a change in another variable to so great an extent. On

the other hand, it is quite likely that the record of income and expenses acquired from carefully supervised farm records will be more accurate than those acquired by the survey method usually used in connection with the farm production coefficient studies. As an illustration, I doubt seriously that one can determine via the farm survey method, the distribution of labor for crops and livestock with sufficient accuracy to make estimates of the effect on income of an increase in livestock investment within the farm business. Nor do I think one can determine by either the farm record or the survey approach the sales value or annual use value of buildings used for livestock independent of the value of the actual farm land.

In respect to technical input-output relationships, there is a strong possibility that we may get the wrong impression as to their use. It is not being suggested that farmers will or should change their level of feeding or the make up of their rations in response to relatively minute day to day or week to week price changes. It is suggested, however, that because of weather and other factors, large changes in the relative prices of different feeds and the prices of animal products relative to feed prices do occur. During a period in which protein feeds are scarce and expensive, we are able to make some such recommendations as "proteins are expensive feeds this year and should be used sparingly." With the use of data such as that indicated in Heady's paper it would be possible to determine not just the cheapest ration but the rations which will put on a 100 pound gain at the lowest possible cost. It also would be possible to indicate the most profitable weight to which the animals should be fed. A further factor which must be considered in relation to seasonal fluctuations in the product price is the rate of gain under each of the various rations. It is quite likely that the ration which puts on the cheapest gain will not be the most profitable ration.

However, in view of the recent emphasis upon grassland farming and the development of new technologies in the harvesting of hay, there are possibly even more important uses than price responses that can be made of roughage-protein-grain substitution rates. There is a need for determining to what extent roughage can be substituted in the ration for both beef and dairy cattle. However there is considerable evidence to support the belief that the extent and the rates at which roughage can be substituted for grains and protein feeds depend upon the quality of roughage. The quality of roughage particularly under certain climatic conditions has been found to be dependent upon the hay making method utilized. Production of high quality roughage under these conditions involves the purchase of high priced equipment. This additional cost must be offset by an increased feeding value of the hay and/or a saving in labor. Thus, it is important to determine in addition to the amount of labor saved: (1) the cost functions relating the cost per unit of harvesting hay under each of several methods to the quantity of hay to be harvested; (2) the feeding value of the different qualities of hay resulting from each hay making method; and (3) the frequency with which these various qualities of hay can be expected from each hay making method.

In grassland farming discussions in the Midwest, the question has often been asked, "Is a feed nutrient in hay equal to a nutrient in grain?" This appears to indicate that laboratory analysis is inadequate to provide the answer. To determine the feeding value, it will be necessary to determine at what rates roughage will substitute for grains. This would be along the lines indicated by

Redman, Heady and others, with the exception that these rates must be determined for each of several qualities of hay resulting from different hay making techniques.

With these data—cost functions and feeding values—available it will be possible to determine under what conditions it will be profitable to improve the quality of hay. I suspect that particularly people on small farms will find it unprofitable to improve their quality of hay along the lines of current hay-making recommendations. If this is true, other recommendations, such as long grass silage and supplemental feeding of fortified proteins with poor quality roughage, will have to be developed if small farmers are to receive a share of the benefits of recent technological advances.

SOURCES AND USES OF DATA IN FARM MANAGEMENT ANALYSIS

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SOURCES AND USE OF TECHNICAL DATA IN FARM MANAGEMENT ANALYSIS*

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ECONOMICS as a discipline is bordered on the one side by disciplines of individual and social behavior and on the other side by technical studies of production.¹ From these social and technical disciplines flow the "given data" about non-economic phenomena that are needed to construct accurate and adequate assumptions for solving any particular problem in economics. Regardless of the accuracy of farm management formulas, results of farm management research cannot be accurate and complete unless "given data" from technical and social disciplines are accurate and complete.

In order that any farmer may maximize net revenue, subject to external limitations and to his value patterns, the cost and revenue functions from which he may choose must be known. To construct any particular cost and revenue functions it is necessary to have: (1) the physical production functions, and (2) the monetary functions with respect to quantities of products and quantities of factors. This particular discussion is concerned with the interrelationship between inquiry into production economics on any individual farm and the technical data necessary for the determination of any physical production function. With respect to the technical coefficients of production or the physical production function for any particular process of production in any plant or farm, we may denote the quantity of output by x , and the quantities of the variable productive services, n in number, by $v_1 \dots v_n$. Then we may write: $x = f(v_1 \dots v_n)$.² This inquiry is limited to a brief discussion of means of improving the flow of data that are necessary for estimating the particular values of the parameters of such an equation. This discussion has been divided among the following topics: (1) general comments on the roles of imagination, logic,

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¹ For further discussion see Wassily Leontief, "The Significance of Marxian Economics for Present-Day Economic Theory," *American Economic Review*, March, 1938, p. 1 ff.

² Sune Carlsson, *A Study on the Pure Theory of Production*, P. S. King & Son, London, 1939, p. 14.

observations, and judgment in research; (2) a brief review of the limitations of our current store of technical data; (3) means of increasing the accuracy and adequacy of technical data; and (4) a summary of the implications with regard to use of technical data.

Imagination, Logic, Observations, and Judgment in Research

By means of logical analysis, which includes definitions, assumptions, classification, and measurement, one may derive conclusions in a tautological sense. But all logical analysis is not necessarily meaningful. For example, there are times when the role of definition has been so overplayed that complex problems of classification and measurement have been "solved" by definitions containing implicit assumptions which render a meaningless "solution." An example of this type of problem is the use that has been made of "efficiency units" in the definition of units of production factors. Leontief has described this problem in the following manner:³

"The concept of efficiency unit was devised as a means of "simplifying" the theory of production by making all the physical productions linear and all the physical marginal returns constant. The new corrected unit is defined as the physical quantity of any factor of production which, if added to any total quantity previously employed, would increase the output by the same fixed amount (measured in its natural, non-adjusted units). . . . The underlying idea is obviously that by some appropriate transformation of coordinates any manifold, however complicated, can be changed into another manifold of a simpler shape . . . all the mental energy which was saved by using the new simplified production function instead of the old one ought to have been spent in figuring out the appropriate transformation formula."

If one's objective is to ascertain: (1) what are the empirical functions that currently are in use or (2) whether there are functions from which more economical choices might be made, it is necessary to determine what the given conditions are likely to be and, when feasible, to test whether observations are consistent or inconsistent with the logical structure. As stated by J. N. Keynes:⁴

"If it [the method] is purely empirical, then it [the conclusion or the 'truth'] will be established only with a more or less high degree of probability, and it cannot be extended far beyond the range of space or time over which the instances on which it is based were collected. If, on the other hand, it [the conclusion] is obtained deductively, then it is hypothetical until it has been determined how far, and under what conditions, the assumptions on which it rests are realized in fact."

³ Wassily Leontief, "Implicit Theorizing: A Methodological Criticism of the Neo-Cambridge School," *Readings in Economic Analysis*, Vol. 1, edited by Richard V. Clemence, Addison-Wesley Press, Cambridge, Massachusetts, 1950, p. 40.

⁴ John Neville Keynes, *The Scope and Method of Political Economy*, Fourth Edition, Macmillan and Company, London, 1917, p. 5.

In order that one may achieve an *understanding* of why an event occurred or failed to occur, or why an event is likely to occur or not to occur, and an *understanding* of any sequence of events and interdependency among phenomena, a system of logic is essential. Such an *understanding* is necessary if one is to attain insights into the future and into the means of creating desired phenomena. Observations provide a means of testing the accuracy of logical conclusions. But all that it is possible for one to prove, in other than a tautological sense, with respect to *why*, *cause and effect*, and *interdependency* among events is consistency or inconsistency between logic and observations. The meaning of the results of research requires judgment of fact.

If research is to be at all creative rather than mechanical repetition of something already accomplished, imagination is essential. Judgment of value as well as of fact is likely to play a part in the selection of problems for inquiry. Different combinations of imagination, logic, observations, and judgment may lead to different results. For example, Utopian conditions may be formulated from a combination of imagination and judgments of value without regard to logic or observations. Pure reasoning requires only imagination and logic. If this reasoning is to be extended to the question of what ought to occur, the judgment of value is a necessary quality also. And if the question concerns what is likely to occur, observations or experience are essential.

Limitations of Our Present Store of Technical Data

Only the most important limitations of a general character and which appear to offer opportunities for correction are listed here. With respect to input-output functions, available data do not cover a sufficient range of variables; interdependency among variables is seldom measured; and seldom do available technical data lend themselves to ready extrapolation to conditions other than those under which the observations were obtained. There is insufficient knowledge, both quantitative and qualitative, of the stock of resources and their distribution among decision making units.⁵

Means of Increasing Accuracy and Adequacy of Data

Four sources of data have been selected for discussion: (1) technical research, (2) "fact-finding" agencies, (3) farmers, and (4) "hypothetical"

⁵For additional questions that arise in general and with regard to a particular problem when one attempts to extend experimental results to the making of decisions on particular farms, see W. W. McPherson, "An Economic Analysis of Cover Crops," North Carolina Experiment Station, Raleigh, December 8, 1951, mimeographed. For further problems that arise in empirical work, see Hans Staehle, "Statistical Cost Functions," *American Economic Review*, June, 1942, pp. 321-331.

data. In many respects these sources are supplementary and complementary rather than competitive in character. Means of improving data from each of these sources will be discussed simultaneously rather than in the order listed above.

A principal question concerns the prediction of shape and location of production functions for any particular farm or farms if new productive services or new products developed by technical research or discovered by other means were extended to the farm or farms. Obviously, if one is to accomplish more than an explanation of history, observations must be drawn from sources other than farms. But neither are the experimental observations sufficient for solving this problem.

A meeting of minds with respect to technical and economic logic is essential for effective cooperative work between economists and workers in other disciplines such as agronomy. Effective integration of disciplines would improve the results of technical experiments *per se* and increase the confidence with which experimental results could be extended to farm conditions. In such an integration, attention must be given to the biological logic of input-output functions in order that one may build a foundation for the "final-type" experiments. Any hypothesis with respect to input-output functions in plant and animal production must flow from the fundamental biological disciplines. I hardly believe that we can depend entirely upon observations in attempting to determine marginal rates of substitutions among feeds in animal production. Input-output functions must be built upon the logic and observations developed by chemists, nutritionists, and animal physiologists. Hypotheses that consist of a dichotomy of straight line and curvilinear functions are not sufficient for deriving functions from which optimum choices may be made. One must know the particular rate of change in the function at all points.⁶ However, in view of the magnitude of the problem, it may be that research must be limited to a relatively small number of conditions appearing to offer some improvements over existing knowledge.

Extrapolations and interpolations to extend technical data over greater ranges may be aided by a greater knowledge of the basic character of plant and animal growth as a basis for experimental design and analysis, and, according to one system of fundamental logic, the design and analysis of applied experiments as continuous functions rather than discrete points. In the future one may find that more and more characteristics of objects, once thought to be "attributes," are "variables."⁷ The

⁶ For example, see John D. Black, "Statistical Measurements of the Operation of the Law of Diminishing Returns by Mordecai Ezekiel and Others," *Methods in Social Science*, edited by Stuart A. Rice, University of Chicago Press, Chicago, 1931, p. 635.

⁷ Attribute is a characteristic that is present or absent; variable is a characteristic that may be present in different magnitudes, either continuous or discontinuous. See

apparent attribute may be due to the limitations of observation. For example, varieties of plants and breeds of animals actually may be variables rather than attributes.

Also needed is further knowledge of interdependencies among specific factors in production. Where there are interdependencies, the experiments will require sample designs and analytical techniques adapted to multiple simultaneous variations. Because of the number and range of relevant variables, it will be impossible to obtain observations for all relevant points. A knowledge of the fundamental biology of the particular problem would aid considerably when interpolations and extrapolations have to be made within the conditions of the experiment and to different conditions with regard to such factors as weather and soils. If carried toward the extreme, I believe that this procedure would be consistent with a second system of fundamental logic that has been labeled "holism."⁸ This system of logic looks upon nature as consisting of discrete, concrete bodies and things rather than a diffusive homogeneous continuum; and the mechanical putting together of the parts of these things will not account for their character or behavior.

Extending Experimental Results to Practice

Now let us turn from the question of improvement of experimental data *per se* to the questions of extending the results of experiments to a prediction of physical production functions under actual farm conditions. It has already been mentioned that the question of *why* with respect to phenomena has been neglected too frequently or omitted entirely in particular inquiries. For this reason there has been considerable uncertainty with regard to any extension of the results to conditions different from those under which the inquiry was conducted; i. e., in extrapolation to different soils, weather and other conditions that may differ from those conditions under which the experiments were conducted. According to John Stuart Mill:⁹

"The empirical law derives whatever truth it has, from the causal laws of which it is a consequence. If we know these laws, we know what are the limits to the derivative law; while, if we have not yet accounted for the empirical law—if it rests only upon observation—there is no safety in applying it far beyond the limits of time, place, and circumstance, in which the observations were made.

G. Udry Yule and M. G. Kendall, *An Introduction to the Theory of Statistics*, Fourteenth Edition, revised and enlarged, Harper, New York, 1950, pp. 1-2.

⁸ Jan C. Smuts, "Holism," *Encyclopedia Britannica*, Fourteenth Edition, Vol. 11, 1939, pp. 640-643. Also, see A. N. Whitehead, *Science and the Modern World*, Pelican Mentor Book, New American Library, New York, 1948 (Copyright 1925 by Macmillan Company).

⁹ John Stuart Mill, *A System of Logic*, Harper & Brothers, New York 1850, p. 538.

The really scientific truths, then, are not these empirical laws, but the causal laws which explain them."

Further work in the fundamentals of physical and chemical properties of feeds and other factors in relation to animal and plant behavior would provide the basic logic for an extension of results of experiments to a wider range of conditions as well as for empirical classifications of animal rations, soils, and other factors on a more rational basis.

Product yield from any given treatment under particular conditions might be expected to produce a normal frequency pattern. But under farm conditions, if expected weather and other variables do not behave in accordance with normal frequencies, the arithmetic mean of the yields will not provide sufficient data for rational decision making. A knowledge of this frequency pattern or yield probabilities is necessary. Under particular conditions one farmer may wish to plant a truck crop before the 50 per cent chance of a freeze has passed. Other farmers or the same farmer under different circumstances may want to take greater or smaller chances.

When adjusting experimental data for predicting the production function of any particular farm, economists might obtain help from soil scientists, entomologists, and agronomists of the Extension Service if these persons have a knowledge of both the fundamentals of agronomy and the environmental farm conditions. The fact that "experts'" estimates would not be subject to statistical tests of significance does not mean necessarily that such estimates for particular purposes would be less accurate than estimates derived from sources that lend themselves to statistical tests. Also, a sample of farmers who have experienced any particular technique under consideration could provide useful data if the sample were correctly designed and the observations were correctly analyzed.

Engineers may provide useful data with respect to input functions of labor, power, equipment, and buildings. For example, if the problem is to determine the minimum inputs for fencing given pastures or constructing specified buildings, these minima probably could be determined more accurately with the aid of our colleagues in engineering and animal industry than from observations of any number of farms. Such items as depreciation, and incidence and extent of disease and insect damage may need to be obtained from a relatively large population of farmers; but this too, would need to be accomplished in close cooperation with appropriate persons in the biological disciplines.

In order that research may be extended to the stages of predicting expected results when applied by farmers, the quality and quantity of farmers' resources must be known. Useful data have been provided by

the "fact-finding"¹⁰ agencies, such as the Bureau of Census and the Weather Bureau of the United States Department of Commerce. More complete and accurate enumeration of attributes and variables and initial groupings with respect to homogeneity in a larger number of relevant characteristics would make it possible for one to accomplish more effective results in classification and measurement. When one must obtain an inventory of the stock of resources by farms, it is likely that these data can be obtained quite accurately from farmers if the qualitative differences are measured in cooperation with such persons as soil scientists. However, with respect to "flow" data, my belief is that additional study directed toward a reduction of measurement errors and bias from other sources in addition to sampling is necessary in order that accuracy of "flow" data obtained from farmers may be increased. Over-all accuracy from a given expenditure may be improved by a balancing of a smaller sample, if necessary, and greater sampling errors with more accurate measurement of observations in such inputs as labor, power, equipment, fertilizer, and feed, and such outputs as crop and livestock yields.

If one's task is to derive input-output functions that would be useful for purposes of *ex ante* decision making, it is obvious that in most circumstances one must end with hypothetical data; i.e., hypothetical in the sense that such a structure in its complete form may not exist in reality and may never have existed in such a manner that one could have observed its behavior. Yet such data would not be purely a figment of the imagination. These data would be developed from imagination, logic, indirect but relevant observations, and judgment of fact.

Concluding Remarks

It is not argued that the economist should spend his time in the development of knowledge in the technical disciplines. However, when solving empirical problems, the economist must consider the knowledge that has been developed by the technical disciplines in order that appropriate choices may be made among all given data. And in the development of knowledge, it may be that division of labor among disciplines in the thinking and planning phases of research has been extended too far for optimum efficiency. It is my belief that the effects of closer integration among disciplines, particularly in the creative and planning stages of our work, would be highly complementary rather than competitive in character. This appears to be true especially in view of the nature of

¹⁰ Fact-finding is distinguished from research in that research consists of inquiry for purposes of deriving answers to the questions of why, interdependency among events, cause and consequence, and, possibly in social sciences, interpretation of the social significance of events, whereas fact-finding consists of recording and initially classifying observations into homogeneous groups.

modern inquiry. Inquiry in its early stages of development appears to have been concerned with classification and later with measurement of newly discovered phenomena and objects. In more recent years, it appears that the objective of inquiry has been extended to include the means of creating desired phenomena and objects and a systematic attempt to discover new phenomena.

With the use of known techniques for sampling and analysis and with an integration of farm management research and research in the technical disciplines, it appears that estimates of what it would pay farmers to do could be made with greater accuracy and for a wider range of conditions. If properly integrated with knowledge developed by the social disciplines, these improvements would serve also as a basis for more accurate predictions of what farmers are likely to do with regard to economic decisions.

HANDLING PROBLEMS OF RISK AND UNCERTAINTY IN FARM MANAGEMENT ANALYSIS*

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MY TOPIC, "Handling Problems of Risk and Uncertainty in Farm Management," has different meanings to different people. I hope the interpretation I have selected will be acceptable to most of you. Under this topic, I propose to do three things. First, I want to relate different common methods of thinking to our concepts of management. It is necessary to do this if we are to understand the roles which our concepts of management play in doing research on risk and uncertainty problems. Second, I want to review very briefly the main lines of progress being made on managerial concepts and risk and uncertainty problems by both theoretical and empirical workers. And, lastly, I want to indicate some sources and uses of information and data for handling the managerial problems, created by the existence of risk and uncertainty. I have no illusions of being able to present anything approaching a complete treatment of this rapidly developing but still incomplete field of interest in the time allotted me.

Relationship Between Thought Processes and Management Concepts

In *The Theory of Experimental Inference*, G. W. Churchman classifies thinking methods according to which of the following four presuppositions are accepted or rejected:¹

- (1) The answering of any question of law or theory presupposes the answering of at least some questions of fact,
- (2) There exist answers to at least some questions of law or theory,
- (3) The answering of any question of fact presupposes the answering of at least some questions of law or theory,
- (4) There exist answers to at least some questions of fact.

In the field farm management, some would accept the first, second and fourth of the above and reject the third. They would agree that the answering of any question of law or theory presupposes the answering of at least some question of fact, that there exist answers to some questions of law and that there exist answers to some questions of fact. This group, however, would not agree that the answering of questions of fact

* The investigation reported in this paper is in connection with a project of the Kentucky Agricultural Experiment Station and is reported by permission of the director. The author is indebted to C. B. Haver, North Dakota Experiment Station, and L. A. Bradford, of the University of Kentucky, for ideas and stimulation.

¹As this generation has inherited answers to questions of both fact and law (theory), the inconsistency between (1) and (3) need not bother us.

presupposes the answering of at least some questions of law. Churchman classified such thinkers as *naive empiricists*. These are the non-theoretical thinkers who desire to let facts speak objectively for themselves because (1) they feel that questions of law or theory need not be answered before answers to questions of fact can be attained and (2) because they actively fear that the introduction of answers to questions of law (theory) would bias their interpretation of facts.

At the opposite extreme are thinkers who would reject the first and fourth presuppositions. These thinkers agree that answers exist to at least some questions of law or theory and that the answering of any question of fact presupposes the answering of at least some questions of law or theory. They would deny that the answering of any question of law necessarily presupposes the answering of at least some questions of fact and some of them would deny that answers exist to any questions of fact. This latter group of thinkers is referred to by Churchman as *rationalists*.

Both groups described above have been important in the history of managerial thought—yet neither has produced an important managerial concept nor contributed much to the solution of risk and uncertainty problems.

Under the guidance of the *economic theorists or rationalists*, systems of economic theory were developed long before the land-grant system began to father its present day farm management departments and sections. These systems of economic theory tended to be based upon assumptions involving more or less constant patterns of wants and preferences, a constant state of the arts and implicit assumptions of perfect knowledge (and foresight) concerning an unchanging state of the arts and unchanging pattern of wants and preferences. The assumed wants, preferences, and states of the arts were realistic but it was unrealistic to assume perfect knowledge of them and that they were static or unchanging. Obviously, the assumption of perfect knowledge was not based on an answer to a question of fact—instead, it was an abstraction made implicitly and often unconsciously as a matter of intellectual convenience. As far as risk and uncertainty problems were concerned, the approach was a rationalist one. As resources owners were unrealistically assumed to have perfect knowledge and foresight, there was no need in the structure of economic logic built up by these people for a managerial unit in each business to acquire knowledge, decide, adjust to such improvements in knowledge and bear responsibility therefore. Systems of static economic theory developed by such rationalist procedures were of little help in understanding management and in solving its risk and uncertainty problems.

Among the naive *empiricists* working in the field of management, similar negative results grew up as the consequences of a quite different process of reasoning. In their quest for objectivity and in their desire to avoid bias and presuppositions from theory, these empirical workers restricted themselves to studying those facts about farm businesses which are most objectively measurable. Very few observations were made on the subjective processes through which managers observe, analyze, make decisions, act, and accept responsibilities. This quest for objectivity prevented development of managerial concepts and led such workers away from the subjective considerations so important in analyzing risk and uncertainly problems. Probably, when these empiricists did conceive of a manager as the thinking, adjusting unit of the farm business, they envisioned him to be an empiricist like themselves and desiring factual data unguided and unbiased by economic theory. As a result, empirical data were furnished to farmers in abundance; the nature of management and problems of risk and uncertainty were not seriously and systematically considered; economic theory was not incorporated into the thinking of these workers; and few attempts were made to teach managers to reason theoretically or deductively.

Those empirical farm management workers employing budgeting used a deductive reasoning technique but were no more fruitful of managerial concepts—their “normal” yield, prices and requirements data were used in budgeting with little regard for possible variations from them and only incidental regard for the processes by which actual farm managers learn, make provision for adjustment as information is acquired and make provisions to take advantage of and avoid the consequences of errors in their information.²

Those empirical farm management research workers employing static, micro-economics principles were no more productive of managerial concepts and principles than their intellectual fathers, the static economic theorists. They, however, were important in establishing a place for theory in farm management which, in turn, makes it easier to introduce dynamic economic principles at the present time.

Along about the World War I period, a general economic theorist began to evaluate the basic assumptions of static economic theory in terms of his own empirical observations. This man, like Adam Smith and Marshall, was more than a rationalist as he tried to base his assumptions

² See H. C. M. Case and D. B. Williams, “Research Attitudes in Farm Management,” *This Journal*, 1951, p. 369 for an alternative discussion and D. B. Williams, “Application of Economic Theory to Farm Management Research,” *This Journal*, 1951, p. 1055 for alternative reasons for the neglect of risk and uncertainty problems in farm management.

on answers to questions of fact. He noted that the unrealistic implicit assumptions of perfect knowledge and foresight often made by theorists were not met in the real world and led to conclusions at variance with it. This man clearly saw that the answering of theoretical questions about profits, management, risk and uncertainty presupposed the answering of questions concerning the acquisition of knowledge and foresight as well as the amount of knowledge and foresight present among managers. In trying to make these assumptions of theory agree with the real world in this respect he became, according to Churchman, an experimentalist.

When *he dropped the assumptions of perfect knowledge and foresight*, he made it necessary for his economic theory to handle explicitly the learning and adjustment processes and errors in information; hence, he borrowed statistical and learning concepts from other disciplines for incorporation into economic theory. This approach led to elementary concepts of risk and uncertainty and started a major advance in the development of managerial theory which was later picked up and expanded by others. Professor Frank Knight, who is the person to whom we refer, presented his ideas in his dissertation on Risk, Uncertainty and Profits. This work which was a product of the experimentalist approach combining theoretical and empirical thinking procedures is a standard reference and point of departure for most discussions of the modern theory of management.

This brief sketch of the relationship between thought patterns employed and concepts of management reveals that empiricists working without theory did not develop worthwhile managerial concepts. It also indicates that the rationalist approach was equally unproductive. The experimentalist approach, however, based on realistic assumptions and employing the keen tools of inductive and deductive logic, was productive. This strongly suggests that our approach should be an experimentalist one based on answers to questions of both theory and fact with answers to questions of both theory and fact as objectives. This means that our approach will be both theoretical and empirical, both deductive and inductive and that answers will be sought to both theoretical and factual problems of risk, uncertainty, and management.

Progress on Managerial Problems

Since Knight's work first appeared, much progress has been made on managerial concepts and problems. For instance, the interest of the general theorists expanded and important conceptual work was done by such men as A. G. Hart, J. R. Hicks, Schackle, and Katona to mention only a few.

Turning to specific cases, we find that the works of A. G. Hart elaborate

and expand Knight's contributions.³ We also find that Katona's *Psychological Analysis of Economic Behavior*⁴ places emphasis on the psychological aspects of the activities of managers and consumers. One great forward stride was taken by Abram Wald, a statistician, who generalized the theory of decision making to include sequential as well as "static" or single sampling choices.⁵ Also, von Neuman and Morgenstern should not be forgotten.⁶ This pair, one a mathematician and the other an economic theorist, *observed* the important role which strategic behavior plays in business activity and then proceeded to develop a system of economic theory closely related to the theory of games and almost entirely concerned with the strategic aspects of management.

It was not long, however, before the imperfections in knowledge and foresight which bothered Knight earlier, began to bother farm management research workers. In 1939, T. W. Schultz, building on Knight's concepts, published an article entitled "Theory of the Firm and Farm Management Research."⁷ This article (which pointed out the need for a theory of management, profits, risks and uncertainty as a guide in doing farm management research and in thinking about farm management problems) became a turning point in farm management thinking.

The agricultural economists also made theoretical contributions as evidenced by D. Gale Johnson's work on forward prices and the work of Heady on uncertainty in market relationships.⁸

I differentiate five functions of management: observation, analysis, decision making, action, and bearing of responsibility.⁹ Forthcoming works co-authored by myself and our discussant, C. B. Haver, in one case, and L. A. Bradford¹⁰ in another, expand (with Hart's aid) Knight's three

³ A. G. Hart, "Anticipations, Uncertainty and Dynamic Planning," *Studies in Business Administration*, University of Chicago Press, Vol. XI, No. 1, 1940 and A. G. Hart, "Risk, Uncertainty and the Unprofitability of Compounding Probabilities," *Readings in the Theory of Income Distribution*, Philadelphia: The Blakiston Co., 1946.

⁴ George Katona, *Psychological Analysis of Economic Behavior*, New York: McGraw-Hill Book Co., Inc., 1951.

⁵ Abram Wald, *Statistical Decision Functions*, New York: John Wiley and Sons, 1950.

⁶ J. von Neuman and Oskar Morgenstern, *Theory of Games and Economic Behavior*, Princeton University Press, 1947. For a popular presentation also see John McDonald, *Strategy in Poker, Business and War*, New York: W. W. Norton and Company, Inc., 1950.

⁷ T. W. Schultz, "Theory of the Firm and Farm Management Research," *This Journal*, 1939, p. 570 f.

⁸ Earl Heady, "Uncertainty in Market Relationships and Resource Allocation in the Short Run," *This Journal*, 1950, p. 240 f.

⁹ Glenn L. Johnson, "Needed Developments in Economic Theory as Applied to Farm Management," *This Journal*, 1950, p. 1140 f.

¹⁰ Glenn L. Johnson and C. B. Haver, *Decision Making Principles in Farm Management*, Kentucky Agricultural Experiment Station Bulletin, in process.

degrees of knowledge which were certainty, risk, and uncertainty. These are expanded into five degrees, certainty, risk, learning, inaction and forced action situations. These same publications note (1) that the main categories of problems for managers to handle include: technology, innovations, prices, personalities and institutions,¹¹ (2) that the marginal economizing principles apply to the subjective costs and values encountered in the managerial processes and (3) that consumption and production are so intertwined under conditions of risk and uncertainty that it is difficult to differentiate between firms and households.

The empirical work which has been done on risk, uncertainty and decision making ranges from experimentalist studies closely guided by various forms of managerial theory to studies in which positive steps were taken to avoid theoretical presuppositions. Thus, we have, on one hand, the groundbreaking work of Schultz, Brownlee, and Gainer on anticipations and uncertainty¹² and, on the other, Reiss' empirical work measuring the management factor.¹³ Other empirical studies dealing with subjective data include Williams' recent work at Illinois¹⁴ and that of Schickele¹⁵ at the North Dakota Station. The July, 1950 issue of *Fortune* magazine reports the result of studying subjective data on corporation

L. A. Bradford and Glenn L. Johnson, *Farm Management Analysis*, manuscript in process, John Wiley and Sons.

¹¹ It is comforting for one trying to integrate to note that a school of thought or something approaching a school of thought exists for each of the problem categories, thus, it can be noted that technological problems have been the prime concern of traditional farm management men; that Schumpeter at Harvard, and Hendrix, an agricultural economist, have been concerned with innovations; that D. Gale Johnson and others have been concerned with price variations; that von Neuman, Morgenstern and Katona have been concerned with personalities; and that, of course, the institutionalists have been concerned with changes in the social, political and economic settings in which managers operate. See D. Gale Johnson, *Forward Prices for Agriculture*, University of Chicago Press, 1947; von Neuman and Morgenstern, *op. cit.*; Katona, *op. cit.*; and W. E. Hendrix, "Availability of Capital and Production Innovations on Low Income Farms," *This Journal*, 1951.

While credit and capital problems appear, at first, to be a separate category, these problems are secondary in the sense that they have more basic roots in the five categories listed here.

¹² T. W. Schultz and O. H. Brownlee, "Two Trials to Determine Expectation Models Applicable to Agriculture," *Quarterly Journal of Economics*, 1942.

O. H. Brownlee and Walter Gainer, "Farmers Price Anticipations and the Role of Uncertainty in Farm Planning," *This Journal*, May, 1949, p. 266 f.

¹³ F. J. Reiss, "Measuring the Management Factor," *This Journal*, 1949, p. 1065 f.

¹⁴ D. B. Williams, "Price Expectations and Reactions Uncertainty by Farmers in Illinois," *This Journal*, 1951, p. 20 f.

¹⁵ R. Schickele, "Farm Business Survival Under Extreme Weather Risks," *This Journal*, 1949, pp. 931-43; "Farmer Adaptations to Income Uncertainty," *This Journal*, 1950, pp. 356-374.

executives. Much of the empirical work on risk and uncertainty has been on the *problems* of managers rather than on the *processes* employed by managers handling such problems. In this connection we find many pieces of work on prices,¹⁶ yields,¹⁷ tenure,¹⁸ and weather.¹⁹

Our survey of progress indicates that the following are important in understanding management and in solving risk and uncertainty problems:

A. Marginality principles in connection with the subjective costs and values encountered by managers in observing, analyzing, deciding, acting, and accepting responsibility.

B. Strategic principles.

C. Learning principles involving both deduction and induction.

Now, as academic farm management men, how do we weight all of these together? Though the answer to this question is not yet in, it is being provided by empirical studies which establish the relative importance of the different managerial concepts and problems.

For instance, a small, empirical study of 31 Kentucky farmers indicates that they employed both inductive and deductive reasoning techniques. Somewhat over-one-half of the farmers sampled placed major emphasis on inductive reasoning. All indicated that they have tried to learn about production methods, inventions, prices, people, and government programs as a basis for business adjustments. Over one-half indicated that production problems were the most important of these—about a fifth thought government programs were most important. All except two were employing the flexibility principle and all were using strategy principles. This scant information, vastly supplemented by everyday observations, makes it evident that strategic principles and both inductive and deductive reasoning processes are of fundamental importance in farm management.

The final formulation of managerial theory will probably utilize these various components on the basis of their importance as revealed by empirical studies. And, if the components are to be used in an integrated way, the final formulation will place heavy emphasis on psychological and sociological principles and data, particularly those dealing with increasing marginal utility of gains and increasing marginal disutility of losses which are so useful in understanding the insuring and risk-taking activities of managers,²⁰

¹⁶ D. Gale Johnson, *op. cit.*

¹⁷ Phillip Thair, *Stabilizing Farm Income Against Crop Yield Fluctuations*, North Dakota Agricultural Experiment Station Bulletin 362, 1950.

¹⁸ T. W. Schultz, "Capital Rationing, Uncertainty, and Farm Tenancy Reform," *Journal of Political Economy*, June, 1940.

¹⁹ C. P. Heisig, "Income Instability in High Risk Farming Areas," *This Journal*, 1946, p. 961 f.

Subjective Data and Information in Farm Analysis

The data and information useful in solving problems of risk and uncertainty are largely subjective. Further, they fall into more than one category. The first category deals with the *processes* whereby managers perform the functions of observing, analyzing, deciding, acting and bearing responsibility in handling problems of risk and uncertainty. Another category deals with the *value patterns* which determine the amounts of risk managers will run, the security they want—in short, their entire scheme of wants and preferences. Yet another category deals with the different *problems* which managers solve.

Sources and Uses of Data on the Managerial Processes.—Helpful material on the management processes is available from many sources. The various bodies of deductive logic, including economic theory and budgeting offer numerous principles and techniques useful (1) in understanding how managers think and (2) in improving the thinking of managers. The same is true of the rapidly developing body of statistical theory with its emphasis on the theory of errors and sequential analysis, both particularly useful in handling problems of imperfect knowledge and in forecasting changes. Similarly, the body of economic theory employing strategic principles is helpful in understanding and improving managerial actions. These principles also help managers envision the counteractions which other businessmen may take—further, they help managers see appropriate countermeasures to take to the actions of other businessmen.

We noted above that the proper emphasis to place upon static economic theory, budgeting, the various statistical theories, strategy principles, learning principles and the different problem areas is still unknown.

As ideas are developed and incorporated into our rapidly developing but still far from complete body of managerial theory and concepts, that theory and those concepts should be checked continuously with empirical work. Also, questions of fact need to be answered as a basis for assumptions useful in integrating and developing theory. And the fact finding must be guided by existing theory if the most relevant facts are to be observed. Empirical data on the processes of management can be secured by everyday observations, case studies and surveys. Friedman's and Savage's work on the utility of choices involving risk is an example of conceptual work based on observation.²¹ The most effective empirical work will likely be closed related to managerial concepts—that is to say it will be experimentalist in the Churchman sense.

²⁰ M. Friedman and L. J. Savage, "The Utility Analysis of Choices Involving Risk," *Journal of Political Economy*, 1948, pp. 279-304.

²¹ Friedman and Savage, *op. cit.*

What uses can we make of information and data about how managers perform the managerial processes? First, an understanding of the managerial processes contributes to one's ability to teach management whether he be a high school teacher, college professor or extension man. The potential importance of this is brought out when one realizes that both the evolving body of managerial theory and empirical work indicate that deductive thinking is an important part of the management process; this is in sharp contrast with the emphasis of extension and vocational agriculture workers on inductive teaching, i.e., learning by doing rather than by reasoning—going from problem to principle, rather than from principle to problem. Once the managerial processes are better understood, we will be able to teach management rather than farm organization and operation. Information on the managerial processes also helps us understand farm people. For instance, my understanding of risk discounting, the flexibility principle, the learning principle and security helps me understand why certain disadvantaged Kentucky farmers do not borrow money to make investments paying as high as 40 per cent returns.

Also, such theories and concepts serve to guide our research—i.e., to cause us to observe the “right” information and to make the “right” interpretations.

Sources and Uses of Information and Data About the Value Patterns of Managers.—Psychologists, sociologists and philosophers are helpful in securing and interpreting information on the value patterns and wants and preferences of people. In addition to general experience and a rural background, the case study and survey methods are appropriate sources of such data and information. Some relevant data are also available from consumer expenditures and investment studies.

The experience of the speaker indicates that psychologists, sociologists and members of the humanities disciplines are of less help than economists in understanding the value of security, long chance taking, flexibility, accuracy, information, etc., so important in management.

The importance of value patterns is made clear by the titles of various extension programs. “Balanced Farming,” “Farm and Home Planning,” “Farm and Home Development Programs” etc., are all names applied to extension programs recognizing the inter-relationships between values and production, between utility and disutility, the farm home and farm business, between the firm and households, and between consumption and investment. An understanding of the values which guide farm families, supplementing the understanding of the managerial processes sought after earlier in this paper, would do much to insure success of farm and home planning in the presence of risk and uncertainty.

Sources and Uses of Information and Data on Risk and Uncertainty Problems.—It was noted above that most of the risk and uncertainty problems which managers face arise from one of the following five conditions: (1) imperfect knowledge about existing production methods, (2) changes in production methods, (3) imperfections in knowledge about existing prices and changes in prices, (4) imperfections in knowledge of and changes in the personalities associated with the farm business, and (5) imperfections in knowledge of, and changes in, the institutions effecting the farm business.

Some of the most important information and data deal with the amount of information in the possession of a manager about problems falling into each of these five categories.

The amount of information in the hands of a manager can be classified subjectively into five different degrees. First, his knowledge can be so nearly perfect that he acts as if it were and he may act either positively or negatively. Second, his knowledge can be good enough for him to "risk it," that is, he may be ready, willing and able to act positively or negatively in which case the value of additional information is not deemed to be worth more than its cost. Third, a manager's knowledge can be inadequate for him to risk action with additional information worth more than cost in which case the manager continues to learn before acting. Fourth, a manager's knowledge may be inadequate for action with additional information not worth its cost in which case no action is taken and no attempt is made to learn. In the fifth case, some outside consideration may force the manager to act even though he considers existing information inadequate for action.²²

It is difficult to secure data and research information on the different degrees of knowledge held by managers with respect to the five problem areas. The process of securing such data and information is one requiring a general knowledge of farming, a very high degree of confidence on the part of the interviewee in the interviewer, a close knowledge of the particular problem on the part of the interviewer and, above all, a knowledge of the processes of management on the part of the interviewer. Case studies have particular value in exploratory work with the survey method coming into its own at latter stages.

Some may ask: What use can we make of information on the relative importance of the different risk and uncertainty problems and the degrees of knowledge held by farmers about them. Such information indicates the subjects farmers are trying to learn, those they are not trying to learn because the subjective marginal cost of learning exceeds its subjective

²² Some would argue that the fifth situation is a special case of the second or first— if so regarded it is still important enough to be listed separately.

marginal value and those they are not trying to learn because they are willing to "risk it" on the basis of what they know.

If evaluated in terms of the mal-allocation of resources resulting from risk and uncertainty, such information indicates to educational agencies, the proper emphasis to place on research and extension activities in the field of production, innovations, prices, human relations and public policy. As research and extension activities are essentially ways of lowering the cost of learning to managers through public subsidy they should be used to serve public as well as private benefits.

Such information, properly evaluated, would also indicate where research and educational methods should *not* be expected to be successful and where some alternative such as publicly subsidized insurance, forward pricing, price-support programs, etc. would be feasible—these are publicly supported schemes aimed at reducing risk and uncertainty rather than helping farmers learn.

And last but not least, information and data about the risks and uncertainty associated with any problem, may help us devise plans to organize and operate farms so as to (1) avoid undesirable changes and (2) take advantage of desirable changes.

DISCUSSION

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Any discussion of a paper may run the gamut of being an outright criticism, being supplementary in nature, or completely ignoring it and making a "speech" on another topic. I prefer to look upon the following as a mere extension of Dr. McPherson's remarks and perhaps a reemphasis of some. The time limits imposed have prevented him from going into detail. I'm not sure he would say them in the same manner but he might agree with the meaning.

The sources of information are few in number—technical experiments, farmers, and theory (including logic, hypothesis, etc.). The use of data probably warrants more time in our discussions than the source. Also, certain types of information can be secured through only one of the sources.

Our data collection process and content is determined by the theory available and the use to be made of the data. Theory that is available seems to be adequate to guide us in solving our more basic problems of production. Our concern is that of having this theory recognized by those in charge of the design and implementation of experiments. We have been content to take the results of technical experiments and apply prices to the factors and products to complete an "economic analysis." Since most of these experiments were designed to seek (largely by trial and error) combinations of factors to secure a maximum output, no thought was given, nor information was obtained, on a *single* production function carried through relevant levels of output. This type of work has resulted in standards, yardsticks, rules of thumb, handbooks, and the like. The

distinct possibility exists that the development of these measures or criteria have retarded progress in the realm of resource efficiency.

What technical data do we want? The best answer would be the big book to which Heady has often referred and which contains a complete inventory of input-output ratios. This would be the ideal and would include such things as rates of transformation of factor into product, ratio of livestock output to feed input at different levels, marginal rates of substitution of feeds and of capital in different forms, and a multitude of other physical transformation ratios.

Obviously, we are going to try to select the more important ones for attention first. Our ideas on this might not coincide with those of the men in the production departments, such as animal husbandry, agronomy, dairy production, etc. One criterion of deciding which areas to work with first would be to select those that deviate the most from an "optimum" or "perfect" combination of resources.

If we had all the technical data, what would we do with it? Very simply, we want to have available information which will permit us to improve resource use. By improvement, we mean a more efficient combination of resources. This implies an increase in the ends relative to the means available. Thus, we have economic progress. A good description of economic progress for the layman might be in terms of "the mostest for the leastest."

As growing evidence that production economists are looking for production functions and substitution rates, consider the number of persons who have been falling back on the Jensen experiment of feeding dairy cows. I have seen no less than six economic analyses based on this study even with its recognized deficiencies from an economic viewpoint. One can visualize how much more would have been attained had an economist with a good understanding of the theory of production collaborated in the planning stage of such a study as Jensen's.

As one example of what we want, let us say producers in a rather homogeneous area with respect to soils, size of farms, and opportunities have not mechanized very much. We'll take one individual farmer and try to answer his questions.

He wants to know if he should dispense with three months of hired labor for the next production period and buy machinery. He would take the \$450 he expected to spend for labor and buy equipment to do an equivalent amount of work. He wants to leave his output constant and compare two different methods of producing this output. The two methods can be looked upon as factors. If he can produce the constant product with less capital expended for factor B (machinery—including costs of operation) than for factor A (labor) his return to capital invested in machinery would be greater.

All this farmer wants to know is the substitution rate of capital for labor. He is not particularly interested in knowing that "of 90 farmers in Williwaw county in 1949, the $\frac{1}{2}$ with the highest labor income had umpteen dollars invested in machinery." This tells him very little. Neither does a figure on dollar investment per acre of land, or per acre of cropland, or any of the customary indices. This type of information simply does not answer his question. In turn, it does not answer society's question of how capital and labor should be combined for greatest efficiency of resource use both within and between industries.

I'm not sure it is feasible to try to get complete information from farmers on problems such as capital-labor substitution rates, feed substitution rates, productivity of fertilizers, etc. Help from the agricultural engineers seems es-

sential on tractor performance rates, fuel consumption, repairs, and length of useful life. Help from livestock production men on feed substitution rates is in order. Personnel from the production departments should feel at ease when we start economic discussions. The farmers' greatest contribution of information is likely to come from qualitative and quantitative statements of resources available (and the answers to questions on decision-making referred to by Dr. Johnson).

I believe we can and should look ahead and anticipate fruitful areas of research. By having knowledge of true production functions and transformation ratios, we would be in a position to pursue an aggressive program fostering greater resource efficiency. This would be through an educational program which included a discussion of the basic principles of economics and logic.

To work out specific answers to an individual's specific question and feed it to him is a waste of time. If he gets the answer in sufficient time to use it, the probability is great that the same solution will not be the correct one next time. He has to come back for a new solution when the price of a factor (or product) changes and when his alternative opportunities change. Also, he might not be able to recognize when these changes take place. Without a basic understanding of how the solution was reached, he is no better off than before he asked for advice. It is probable that our educational system (for producers or firm managers) will need revamping.

I believe part of this threads through what Dr. Johnson was saying when he contrasts teaching by reasoning rather than by doing. There is no question in my mind which is the more productive method.

There is no evidence to indicate that the farmer is unable to use reason. Most farmers readily understand that it takes more fuel to drive 60 miles in one hour than to drive 60 miles in 2 hours. The principle here is one of substitution—if we are short on time, we use more fuel. If we have an abundance of time, we use less fuel. The use of two feeds that substitute for each other is an exact analogy. Under the one system of education, the farmer needs to have this pointed out to him. Under the other system, he will recognize that the underlying principles apply in both cases.

Concluding, I would like to say both papers have provided us with plenty of material for a good informal discussion.

DISCUSSION

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I find myself basically in agreement with Drs. McPherson and Johnson. It is some satisfaction to know that research plans in North Dakota are so much in accord with what these two farm management researchers deem important.

Dr. McPherson has neglected putting the focus on the decision making process in a setting of risk and uncertainty. Too often in recent years we have been putting the stress on the need for data from the non-economic sciences without a thought as to how the farmer is going to use such information. That is, we have not investigated the process by which he makes decisions, why he does what he does, why he wants what he wants, and so on.

Dr. Johnson has brought out and emphasized management as necessitated by

the existence of risk and uncertainty. Continual learning and adjusting on the part of the manager in a situation of change and imperfect knowledge is of prime importance. Therefore, he has put the emphasis on the need for subjective data and information in solving managerial problems. We have got to stress more, not less, deductive thinking; the inductive is not complete in itself in farm management analysis. Our research emphasis should integrate thoroughly the theoretical and empirical in a dynamic setting. A theory of management was presented in which it was argued that managers perform the functions of observing, analyzing, deciding, acting, and bearing responsibility, with respect to the problems they face. This is a general model of the management or decision making process. There are others; and, in fact, a management theory still remains to be spelled out adequately.

Dr. McPherson emphasizes the need for the improved given data from the non-economic disciplines with emphasis on the technical. He makes a strong plea for the cooperation of production economists and technologists, suggesting that among other things we need very detailed production relationships. In my opinion, such a formulation is likely to elicit the very opposite of cooperation from applied physical scientists. I do not wish to imply that I am against more cooperation with applied physical scientists. But I would try to aim at delineating the critical areas of production relationships that would aid production economists most in dealing with farm management problems. Production economists and statisticians in many cases could provide more appropriate designs of experiments to obtain certain technical data. It is our job in this inter-departmental cooperation in the beginning to spell out wants simply and suggest the techniques for getting them most appropriately, or else, our applied science colleagues are likely to lose heart at the complexity and formidableness of the task.

I would like to see more emphasis on problems rather than gathering detailed data on production coefficients in the hopes that someday such data can be used in solving problems. For instance, recently I have been working on a dairy enterprise study in which I was concerned with the economics of production in low productivity herds. On talking with my dairy production colleagues I found that there was a lack of information on cows of this type concerning their responsiveness to feeding, breeding, and management practices. Most of our work across the country for years has been on well-bred college herds. This is a peculiar emphasis for 75 per cent of the herds and 66 per cent of the milk cows of our state are of low productivity, i.e., below 5000 pounds per cow in annual production. I am certain similar conditions exist in many other areas.

Let me pursue this further. The project to which I am referring is part of our long run research plan to build up information to aid in farm decision making. In farm enterprise studies for instance, we have spent much time in spelling out just how farmers make decisions in regard to the enterprises they have and the resources that they use in a setting of continual change and imperfect knowledge. We have reviewed the various strategies that might be used depending upon such factors as experience, training, knowledge, family, age, financial and tenure position, etc. A survey was taken to obtain from farm operators (1) their reasons for having done what they did and their plans; (2) the processes and information they used in making decisions; and (3) what types of information, processes, and institutions were needed to improve the accuracy and increase the speed of one's managerial actions. Thus we have obtained much subjective data and information on farm enterprises and farm organizations. We are build-

ing up our technical coefficients through farm input-output studies via records, schedules, and cooperative projects with our applied physical science departments. Technical people in some cases are setting up new projects or revising old ones to meet our needs for data. In some cases we are mutually making production response estimates. For instance, in the dairy study, farmers supplied us with their costs and production information via records and schedules. Also farmers provided us with much subjective information on why they did what they did, their plans, and expectations. Our dairy production men are providing us with certain production coefficients via estimation methods based on experience and research. Our aim is to present the information and analysis in such a manner that a farmer would be aided in making a decision with respect to (1) having a dairy enterprise or other alternatives, (2) the best size of herd for a given situation, (3) the most profitable level of feeding, (4) the most economical practice for this situation, etc. Then as a continuing program to fill certain gaps in the future, various management practices are going to be studied experimentally both in our experimental barn and in supervised on-the-farm experiments.

We are finding that the budgeting device, while it is being used extensively in the analysis, also is very useful to us in quickly pointing out critical coefficients on which we must have more accurate information before we can draw conclusions about the economy of certain strategies.

TEACHING FARMERS TO USE ECONOMIC INFORMATION

Chairman: Frank Beck, Rutgers University

INTEGRATING RESEARCH AND EXTENSION IN THE FIELD OF FARM MANAGEMENT

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ONE must have a clear understanding of the full meaning of integration if he is to be expected to achieve more effective integration of research and extension in the field of farm management. Many of us confuse the words "integration" and "coordination." These words represent two entirely different ways of thinking—or perhaps two different types of philosophy.

To coordinate is to regulate and combine in harmonious action; to adjust that of the same order or degree; equal in rank or importance. In other words, to coordinate is to make sure that each segment or branch maintains its proper place in the organizational hierarchy.

To integrate is to form into one whole; to make entire; to complete; to bring together the parts into a whole.

Coordination places emphasis upon the part that each segment should contribute to problem solving. Integration emphasizes the role that farm management will play in solving these problems.

Why should integration be the goal instead of coordination?

Major activities within the colleges of agriculture are of three kinds, namely, research, extension, and teaching. Work in either research, extension, or teaching done independently of the others will make a contribution to society. But by working as a unit through an integrated program, the end or total results should be greater than the possible contributions of each segment working independently.

How does this apply to the subject at hand? What are the objectives of a program of integrated research and extension in farm management? The objective of all farm management work should be to assist farmers in making decisions that will maximize total national welfare. To the individual farmer, that means maximizing his family's total satisfaction with

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whatever resources he may have at his command. And the most commonly recognized means of the farm family's ability to maximize total satisfaction is net farm income. This means that in farm management, technical production data and economic information must be made available to farmers so they can make intelligent management decisions. Farm management is primarily decision making, with the acceptance of the responsibility of these decisions. A farmer's decision can be no better than the quality or realism of his information.

Farmers' interest in professional and academic farm management is likely to be expressed in personal terms such as: "What important problems do I have that farm management people can answer?" And unless we do have answers, farmers won't be interested in us very long.

Many of us like to think of farm management as a center around which economists, agronomists, animal husbandrymen, agricultural engineers, etc., meet to organize a farm for its most economic production capacity consistent with changing family needs. The integration of research and extension farm management includes working with all subject matter fields having specialized information that farmers use in planning the business of farming and family living.

How Much Integration Do We Have?

How much integration do we have in farm management?

The degree of integration in different states varies greatly. Some states report that little integration exists; that extension personnel are housed in another building apart from research, and teaching personnel. Other states report that they have developed a long-range integrated program; that for many years research, extension, and teaching have been housed together.

Other illustrations of present day integration of various states are:

- (1) Joint research-extension-teaching departmental head.
- (2) Research and teaching representation on extension planning.
- (3) Extension representation on research planning.
- (4) Exchange of services in meetings, lectures, and tours.
- (5) Extension participation in seminars.
- (6) Joint review of extension and research materials.
- (7) Extension personnel as coordinators on research projects.
- (8) Multiple or dual appointments of research, extension, and teaching.
- (9) Extension publication of research reports.
- (10) Popular publications on research findings by extension as the research project progresses.
- (11) Joint authorship of publications.

How To Achieve More Integration?

How do we get more and better integration in farm management?

The simplest way to answer this question is to refer back to the illustrations just cited. That would be to say "do as I say and follow me." But the problem is not so much "what to do" but "how to do." At least two additional points need to be considered: how we may go about achieving greater integration between research and extension and why integration actually contributes to better farm management work.

One cannot very effectively compel or decree that henceforth we shall have an integrated program of farm management. Before integration can become effective, it must have vigorous leadership. If administrators are unenthusiastic, very little can be accomplished by individual subject matter workers. It is the direct responsibility of the departmental head to encourage and provide leadership for integrated action. The idea of cooperation between individual persons within research, extension, and teaching, and between subject matter departments is a way of thinking that sometimes catches on very slowly. Patience and persistent prodding is often required. In addition, extension should be in a better position to understand research's attitude toward certain problems. And extension could express its views as to what methods it thinks research should use in making particular studies.

By having extension represented on research planning, research people should be able to obtain a clear picture of farmers' problems. And extension would be in a position to suggest what it thinks would be the type of information that would be most useful to farmers. In addition, extension should have some idea of the priority of problems with which researchers should concern themselves.

An interchange of extension and research personnel in their respective fields of work should benefit both groups. Participation of research personnel in occasional farm meetings should help to keep research informed as to what farm people are thinking and what their problems are. There is nothing like face-to-face communication for better understanding. Theoretically, at least, extension people are supposed to report the problems of farmers to research and to report research findings to farmers. As good as this may be, additional direct contact between research and farmers should be beneficial if it does no more than remind researchers of one important fact. This is that farmers still are primarily interested in information that will help them make intelligent decisions at the farm level.

Extension personnel may benefit by participating in class lectures and particularly in seminars. In seminars, extension and research people may acquaint themselves with the broader theoretical concepts of farm

management that they may tend to forget in their day-to-day routine activities. Too many of us are guilty of not being able to see beyond our respective state borders or beyond our particular field. Occasional contact with classroom theory may remind us that the welfare of farmers is to a large extent conditioned by forces beyond the control of the individual.

In some cases, greater integration could be accomplished if research and extension held joint appointments. That is, if personnel work in both research and in extension. A disadvantage of joint research and extension appointments may be in the individual's inability or lack of desire to shift his reasoning from the narrower farm or state level of much extension work to the broader national and international level necessary for certain types of research, and conversely. However, I believe there is sufficient room for the broader type of reasoning in extension and I would not dare to say that the more outstanding extension workers have not been reasoning such. Joint appointments may be held at the same time or during different periods of the year or different years. No one definite time formula can be derived that would be satisfactory to everyone. The abilities and limitations of individuals may be the deciding factors.

Successful research and extension appointments would not only depend upon individual workers, but more upon the ideas and attitudes of top administrators. The type of leadership, whether negative or positive, could easily spell success or failure of joint extension and research appointments.

Training of Personnel Important

Regardless of the amount of administrative leadership that may be directed toward integration, the training of personnel is of great importance. Research and extension personnel must have broad theoretical training before they can be expected to realize that teaching, extension, and research are not three separate entities completely independent of the others. In my judgment, there is no justification for the feeling that either teaching or extension or research work is inherently superior and that either group is of the elite. Before we can have effective integration between research and extension in farm management, personnel—particularly on the state level—must be capable of thinking in terms of both research and extension. Each must be able to feel at home in either extension or research work. This cannot be effectively attained until research and extension personnel are adequately trained in economics.

One of the handicaps within extension is the lack of appreciation of the place and application of economic theory and of research methodology. Many extension men say "we want something practical," never realizing that any practical answer is based upon some kind of social theory—i.e.,

one's concept of the forces that operate in a society, regardless of what it might be. Theory is useful only if it can be used to solve problems; it should be justified upon no other criteria. Answers to economic problems will be conditioned according to whether you are a Classical, Keynesian or Institutional economist. A practical answer can be no better than the theory upon which it is based. Its validity depends upon the realism of the theory (combination of hypotheses) one applies in arriving at the particular answer.

In this age of reasoning, we are able to apply a theory of cause and effect in arriving at answers to most problems. Aversion to economic theory by some of us may be the result of one or more reasons. First, one's theory may be no good—not realistic in that the assumptions upon which the theory is based may be very unrealistic. Therefore, an answer to a real problem based upon that theory would likewise be unrealistic. Secondly, persons responsible for giving practical answers may be unable to deduce them from the theory because of their lack of economic training. Thirdly, there may be too little supporting evidence to the theory from which to formulate a practical answer. Much research in policy matters must be done deductively; many proposed solutions cannot be proved or disproved inductively.

Extension receives hundreds of letters annually from farmers, non-farmers and county agents asking for specific information. Such inquiries provide evidence that farm management workers should be teaching economic principles instead of answering specific questions. Extension workers in farm management could to good advantage spend more time and effort in teaching economic principles—primarily to county agents who in turn would be able to answer farmers' questions. By teaching more principles of farm management, the fewer specific questions we'll be called upon to answer. A state extension specialist in farm management cannot hope to accomplish very much if he devotes a large proportion of his time to the diagnosis of individual problems instead of teaching in general terms.

We have a similar problem in research methodology. Few persons without advanced formal training in economics appreciate or understand the importance of research methodology. Extension's value to research and the use extension could make of research's findings may be limited. A partial solution of this problem is the selection of more advanced trained personnel. But the situation that exists today cannot be remedied overnight. Short-run measures such as short courses in general economics and in the related fields of farm management may be offered to those interested. In addition, extension need not hope to acquire and hold highly-

trained personnel unless it is willing to pay salaries comparable to those paid by research and teaching.

Another point at which extension and research people may integrate their efforts more effectively is the joint reviewing of materials. Research and extension should thoroughly study research reports. And it may be helpful if research personnel would review material for extension meetings and publications. Joint authorship of articles and a joint departmental reading committee for all written materials should improve the quality of published materials.

The problem of disseminating research findings has by no means been solved. There are indications that we are falling behind in getting results of research to farmers quickly enough and in a form sufficiently readable for them to understand its implications. We have the new medium—television—which is little explored, but promises to revolutionize extension work. A well-produced TV show has a better chance of getting into a farm home than does an extension meeting of getting a representative from that home.

SELECTING ECONOMIC DATA TO PRESENT TO FARMERS

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FROM a practical point of view, subject matter and methodology cannot be separated in an extension economics program. The best subject matter either may not be understood or can be misconstrued to the point that it actually becomes harmful if a poor teaching method is used. Conversely, the best teaching methods are useless without information to be taught. For analytical purposes, however, it is extremely useful for one to separate methodology and subject matter. Joint consideration of the two aspects frequently results in broad omissions in subject matter simply because a good method for presenting certain economic data is not available.

Purpose of this paper is to outline criteria for selecting economic data and to present an outline for the logical arrangement of subject matter in the field of economics. Before this material is discussed, however, we should review the objectives of extension economics work and the educational process. This background information will aid in reaching conclusions about the primary purpose of the Extension Service.

Objectives of Extension Economics Work

According to the Smith-Lever Act, the purpose of the Cooperative Extension Service is "to aid in diffusing among the people of the United States useful and practical information on subjects relating to agriculture and home economics, and to encourage application of the same."¹ Administrators have decided that a class of subject matter labeled as *Agricultural Economics* is useful and practical information and should be presented to the people of the United States and that its application should be encouraged.

Under the authority conferred by the Smith-Lever Act, the over-all objectives of agricultural economics, or for that matter of any other line of work, could be to improve through education:² (1) the welfare of individual farm families; (2) the welfare of agriculture without reference to individuals or groups of individuals in agriculture, or (3) the economic welfare of society in general. Although the stated or intended objective might be the improvement of the welfare of the individual family or of

¹ Smith-Lever Act of 1914. This quotation has been taken from *United States Code*, 1946 Edition, Vol. I, p. 343.

² These objectives were adapted from a paper by M. S. Williams and W. H. Pierce, "Objectives of Farm Management Extension Work" presented at a conference on Extension Work in Agricultural Economics, North Carolina State College, Raleigh, N.C., May 13, 1952.

the agricultural segment of the economy, much of the educational work has really resulted in the improvement of the welfare of society.³ This is a fortunate circumstance, as the Smith-Lever Act apparently intends "improving the welfare of society" to be the over-all objective.

Specific objectives of extension agricultural economics may be listed as follows:⁴

1. To provide information which helps families engaged in agriculture to determine their economic opportunities so that they can do a better job of making rational decisions. The major decisions which the farmer must make are: (a) should he farm? (b) what products should he produce and in what quantities? (c) how should he combine factors, including the quantity of each? (d) what technology should he use?

2. To supply information on implications of policies and programs which impinge upon decisions at the farm level and to suggest and appraise alternatives to the proposed policy or program.

3. To acquaint the public in general with both the internal and external economic aspects of agriculture, including the implications and consequences of changes in policies and programs relating directly or indirectly to agriculture; economic development in agricultural areas; and other phenomena which influence the decision making process of economic units.

4. To ascertain the location and nature of problems facing decision making units which may require more detailed study before logical alternatives can be suggested to guide farmers in their decisions and to secure assistance from research workers and others who can contribute to the solution of the problems.

The Educational Process

In selecting material to present to a class or to farm people, one should keep in mind the educational process. The educational process may be divided into four steps.

1. It should provide the stimulus that will make the student want to learn and strive to accomplish his goals. The desire to learn is instilled by the good teacher by having the student set goals designed to improve his welfare.

³ This position was argued by Earl Heady in a seminar on "Criteria for Allocation of Resources in Research and Education in Land-Grant Colleges," North Carolina State College, Raleigh, N.C., March 31, 1952. Heady bases his argument on the fact that most research and education have resulted in increased output which, along with an inelastic demand, pass the benefits on to society as a whole. Also see Earl Heady, "Basic Economic and Welfare Aspects of Farm Technological Advance," *This Journal*, May, 1949, pp. 293 ff.

⁴ M. S. Williams and W. H. Pierce, *op. cit.*

2. It should provide information that will aid the student to make decisions that will help him to attain his goals. The educational process precludes the presentation of information in such a way that it suggests the decision. Principles and alternatives should be presented and the alternatives should be appraised. When decisions are made for students or when information is presented in such a way that only one decision is possible, true education is impossible.

3. It should encourage the student to make decisions. While the decision should not be made for the student, the student should be encouraged to "get off the fence." The student should be made to realize that all of the data needed to enable him to make decisions are never available and that there is almost always conflicting evidence. He must make decisions in light of the evidence available.

4. It should encourage the student to do something about the decision, if the decision requires action. Education when considered in the aggregate is a failure unless it results in action.

The material presented and the method of presentation should aid one in the educational process. All four steps may be accomplished by one set of data and by one method of presentation. The process, however, eliminates certain methods of presentation, i.e., those which prescribe or give the answer.

Selecting Economic Data for Presentation to Farmers

Considering the objectives of extension economics work and the educational process, what criteria can the extension economist use in selecting data? In the criteria listed below it is recognized that there are limited resources available for educational work in agricultural economics and that the economist should select activities which offer the highest marginal returns.⁵ These criteria, which are not independent of each other, are listed as:

1. The material should have a bearing on an important problem. Classification of the problems into several categories is helpful. They can be classified as short or long range problems. Other classifications are the "felt problems," or those problems that farmers and county agents write to the specialists about, and the "normative problems," or those problems which are not felt at least at the present but which can be predicted as following from certain courses of action.⁶ There is a high

⁵ The principle of equal marginal returns applies in such a case. Returns are maximized for an individual Extension Economist or for several working as a unit when the net marginal returns from the several activities are equal.

⁶ For additional comments along this line see Murry Benedict, "The Social Sciences in Experiment Station Research," *This Journal*, May, 1949, pp. 253 ff.

correlation between short term and felt problems and between long run and normative problems. All types of problems should be considered. The long run and normative problems are often more important than other classes. Yet the press of short term and felt problems may cause the workers to slight the other types.

2. The information should be useful and helpful in decision making. Data that merely recount past action should be excluded unless they have a bearing on decisions, which are always looking to the future. This criterion places a high premium on theory or principles since the data are useful, indeed more so than other data, for decision making.

3. The information should help attain the over-all objective of improving the welfare of individuals, of agriculture in general, or of society as a whole. The specific objective will depend upon the teacher. It is doubtful, however, if an objective for a publicly supported educational agency of other than "the improvement of the welfare of society" can be defended.

4. The data should be within the scope of economics. Economic information may be defined as "the principles or the logical criteria and the factual materials that are relevant for purposes of understanding the process of making economic decisions and the economic consequences of any particular action."⁷ This criterion does not imply that all economic material should be presented by the extension economist or that the extension economist should be limited to economic material. It does imply, however, that the scope of economics should be examined by the economist with the view of including, insofar as resources permit, the entire field of economics. Since economics is not an easy subject, those responsible for teaching economics are prone to present other data and not cover the field of economics.

5. As it is usually impossible for one to supply all economic data to all people, those teaching economics should select data which promise the highest marginal returns in light of the objectives. The exact marginal returns from each set of data are unknown, but research and observations of scientists and farmers shed considerable light on possible marginal returns from any given set of data. When he is selecting data to present, the economist should consider all the evidence that is available on expected returns. A situation of rationed resources, which almost always prevails, also places a premium on theory or principles which have more lasting value than empirical evidence.

⁷ W. W. McPherson, "Subject Matter and Problems that Should be Covered by Extension Workers in the Field of Agricultural Economics," a paper presented at a Conference on Extension Work in Agricultural Economics, North Carolina State College, Raleigh, N.C., May 13, 1952.

A Logical Arrangement of Subject Matter

There are at least two alternatives that could be followed by one in presenting the subject matter content of an agricultural economics program. The first alternative is to list problems and assign an order of importance to them, based on research and value judgments, and to indicate the economic aspects of these problems. A second alternative would be to present a conceptual framework for the organization of economics material. The second alternative has been chosen for this paper as the actual problems vary from area to area and from time to time. In actually developing a program those responsible must consider the problems and their relation to the framework.

Before outlining the content of programs, one should recognize that the main function of an economics program, as well as other educational programs, is to provide information which will help the decision making units in making and in executing rational decisions. The major private decision making units are the producing firms which may be individuals, households, or corporations, marketing firms, and consuming units which may be individuals and/or households. There are also public decision making units which must be considered. The conceptual framework is divided into parts because of differences in the principles applicable to each part (i.e. theory of the household, firm, market) and because of differences in other disciplines (i.e. political theory, agronomy, nutrition) which must cooperate in providing the information needed for rational decisions.⁸ The conceptual framework is divided into five parts as follows:

1. Producer decisions of the individual and of the firm and economics of production.
2. Consumer decisions of the individual and of the household and economics of consumption.
3. Consequences, in the aggregate, of producer and consumer decisions or economic interdependency among firms, among households, and between consumption and production.
4. Group policies and program, and economic change.
5. Skills, tools, and techniques which aid one in making and executing decisions.

The remainder of this paper is devoted to a brief discussion of each of these parts.

1. *Producer Decisions.* The assumed objective of the economic producing unit is the maximization of disposable income, or what will be

⁸ The first four items in the outline and much of the discussion of the items were taken from the paper presented by McPherson, *op. cit.*

called net income.⁹ Net income is a function of the kind and quantity of factors used, prices of factors, kinds and quantity of goods and services produced, and prices of products. As prices are given, or are assumed to be given, to the individual producer, the major decisions in maximizing net income revolve around the type and quantity of goods and services to be produced and the combinations and quantities of factors to be employed. The data needed to make the decisions include: (1) the household pattern of values, (2) the institutional framework, (3) the firm's objective, (4) the technical coefficients of production, (5) the price or value functions of factors and products, and (6) the capital position of the firm.

It is not the economist who must supply all of these data. Indeed, the individual unit knows its value pattern, its capital position, and, to a certain extent, the institutional framework in which it operates. The technical coefficients of production or physical input-output relationships must come from "technical" workers. The extension economist's job is to supply the criteria or principles the unit needs in formulating decisions to maximize net income, such as the principles of substitution and added cost-added returns, and factual "economic" information, such as material on prices or values and the institutional framework.

Although the firm's pattern of values and objectives are considered as given when making any specific decisions affecting income, the extension economist, along with members of other disciplines, may spend some time presenting materials which result in changes in the firm's pattern of values and objectives. The changes, however, should not be prescribed.

It must be recognized by the economists that production decisions are not treated independently of consumption decisions by an actual unit. This fact shows up clearly in the decision which allocates net income between consumption and expansion. Also, personal values may affect the means of producing. For example, owning land may result in a lower net income than renting land to a firm, yet land is owned because it adds more personal satisfaction than renting.

One of the problems of carrying out an educational program with producers is the division of subject matter between disciplines. The solution may vary from state to state and from time to time. It should be remembered that the farm manager needs information from all fields—both technical and social—and that individual parts do not necessarily add to a whole.

2. *Consumer Decisions.* Problem of the consuming unit is to determine what and how much of each product to buy. Data needed include (1)

⁹ It is recognized that there may be other objectives or that this objective may be absolute.

the objectives of maximizing satisfactions or the preference patterns of the unit, (2) technical coefficients, (3) income available for consumption, (4) institutional framework, and (5) prices of products including services available for purchase. The preference pattern and income available for consumption are known to the unit, although the teacher may profitably allocate some time to presenting data which may result in a change in preference patterns. The changes are secured by presenting and explaining results of alternative consumption decisions, particularly the results over time. Data on technical coefficients of consumption must come from technical disciplines.

Responsibility of the economist to consuming units is quite similar to his responsibility to producing units, namely, teaching the relevant principles (which are about the same as those used by the producing unit) and factual economic information, such as price behavior and relationships and the institutional framework.

In practice, this phase of economics has been left to the home economist who, either through insufficient training or through lack of coordination with the disciplines of human nutrition and family engineering, has frequently spent the major part of her time on technical phases of consumption. Such administrative arrangements do not hide the responsibility of the economist.

3. Aggregative Analysis of Individual Decisions or Economic Interdependency of Decision Making Units. Objective of this phase is for the economist to provide information to enable decision making units to understand the consequences of the sum of individual decisions and the manner in which the economy functions. The specific phenomena to be explained include for any group (1) kind and quantity of output, (2) price and quantity relationships between and within individual products including non-agricultural products and factors employed in and out of agriculture, (3) factor employment, and (4) income. Data needed to explain these phenomena include producer and consumer behavior as groups of individuals; institutional conditions; and stocks and rate of change in quantity and kinds of products and resources and in size and composition of the population that will consume the goods.

As in the case of producer and consumer economics, the extension economist has the job of teaching the relevant principles, which are different from those used in other phases of economics, and to supply the necessary factual economic information. Incidentally, most of the data needed in this phase of economics must be supplied by the economist. The economist is frequently called upon to explain the consequences on output, prices, or some other result of a certain course of action by a

group, or to explain the consequences of alternative courses of action by the group. The economist can make this explanation, if he has the relevant logic and facts, as can any other intelligent person. The educational process, however, requires that the economist teach the principles and supply the factual material that will enable the group and individuals in the group to make their own analysis.¹⁰

4. *Policies and Programs and Economic Changes.* The objective in this phase is for the economist to provide information which will enable groups and individuals to make rational decisions with regard to policies and programs (i.e.—those decisions which will enable the decision making unit to realize its objective of maximizing social welfare or whatever the objective may be) and the rate of economic change in relation to the institutional conditions and size and distribution of income. This decision making unit is usually a group. However, in a decentralized economy, the individuals need information in order for the group to arrive at a decision.

The specific phenomena to be explained include: (1) processes of formulating policies and programs; (2) economic and social consequences of particular policies and programs (i.e. effects on such items as prices, resource employment, capital accumulation, output, size, and personal distribution of income); and (3) causes of interdependencies, and consequences of capital accumulation, population changes, and new technology. Data needed to explain these phenomena include stocks and physical productivity of resources, population, social behavior, social objectives, and political framework, and the data from the three parts of economics described above.

The economist's job is to supply factual economic material and principles which will help make the data meaningful. The sociologist and political scientist must combine with the economist and physical scientist to supply all data needed in this area.

5. *Management Skills, Tools, and Techniques.* This class of material is different from the four preceding classes. No particular phenomena are to be explained and no particular body of economic logic is to be used. This group of material, however, may be equally as or more important than the other classes of material to the extension economist and to the farmer. This fact is particularly true as there are always gaps in the data

¹⁰ A dilemma is faced in this phase of economics if one objective of society is decentralized decision making. When individuals and groups gain a knowledge of principles and factual materials dealing with market relationships, they may turn to group action in order to influence the market rather than act as individuals and take the market as given.

needed for one to arrive at a final answer to a decision. Also, the farm manager has the job of executing as well as of making decisions, and the manner of execution may have as great effect on net income as the decision itself.

There are skills, tools, and techniques which the farmer can use in arriving at decisions. The two more important ones are farm planning and farm accounting. There are managerial skills and techniques that the manager can use in executing decisions, such as recruiting and supervising labor, grading and packaging products, buying and selling inputs and outputs, and arranging for and using credit, *ad infinitum*.

The extension economist has a responsibility for teaching at least part of these managerial skills, tools, and techniques.

Many extension economics programs have been designed to teach farmers managerial skills, tools, and techniques. Such a program undoubtedly is incomplete. On the other hand, a program devoted only to teaching economic principles and factual material is incomplete. In my opinion a good program should include the four parts of economics. These deal with producer decisions, consumer decisions, aggregative analysis of individual decisions, and policies, programs, and economic change, plus the managerial aids, with emphasis on the principles and factual economic materials.

METHODS OF PRESENTING ECONOMIC DATA TO FARMERS

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MANY of the difficulties which have confronted us as economists in presenting our material to the layman have resulted from confusion relative to our function as educators. After completing an involved training program in economics, most of us have felt that we must throw the book at the layman to give him the proper answer. This approach resulted in the layman walking out. Then we tended to turn to the other extreme of giving him the final answer. Too many times he found our answer was wrong. Thus, neither approach proved satisfactory, and we turned to various compromise approaches, which have caused the layman to make many quips about the economist.

Most farmers are not interested in economic data or principles from an academic approach unless they are related to a particular problem. They are interested in economic data when they have a bearing on the price of hogs, the answer to a public problem, or a change in the farm organization. Therefore, most of our economic data and principles are presented and taught to farmers in connection with some problem. Because much of this information is used in activities concerning public policy, farm management, and outlook, I should like to treat the subject under these headings.

Economic Data and Public Policy

Let us first turn to the question of presenting economic data in connection with public policy issues. I choose this area first, because it is here that some of the problems come most sharply into focus. As we observe all individuals in this field, whether in educational work or not, there are five approaches or ways of organizing economic data for presentation.

1. A presentation of facts and/or an explanation of programs which bear on policy issues but with no statement of issues or their implications.

Under certain circumstances there is a place for this approach. It is sometimes our job to explain the workings of a new program. An explanation of the A.A.A. program in its early stages is an example. There also may be a limited number of instances where we may present economic data with little interpretation of their implications. However, it does not seem to me that this can be classified as policy education in most cases. Furthermore, the presentation of economic facts without relating them to some problem usually requires a captive audience.

2. The presentation of a position supported by sorting and assembling facts that justify the position.

Individuals and organizations trying to shape public opinion and arouse support for a certain cause use this approach. Those groups only for or only against the Brannan Plan are examples. Pressure organizations consistently use it. I do not see a place for this approach in the educational field, although it sometimes creeps into our work.

3. The analysis and evaluation of a public problem based on certain unstated but assumed assumptions and criteria.

Many economists make certain assumptions and then in the light of these unstated assumptions make an economic analysis. In the light of these unstated assumptions, they may come to the conclusion that certain policies are good or bad. This is the position of the elder statesman and there is a need for certain economists to take this position. The difficulty with this approach is that economists come out with different answers, not because they differ in their economic analysis, but because they start out with different assumptions and value judgments. There is a place for a certain number of economists to do this, but if all extension economists adopted this policy in presenting their economic data and principles, I am afraid that we would be out of business.

4. The setting up of criteria and the analysis of policies in the light of these criteria.

This is probably the most scientific approach and works best among scientific groups and when the analysis is presented in writing. It is the approach usually employed in teaching economic theory. The emphasis is not on whether the assumptions are correct but whether the economic logic is true. Greater consideration, in my opinion, needs to be given to this approach in research. However, it is subject to some limitations when used at extension meetings, because values vary between individuals and therefore assumptions. Confusion often arises because a portion of the assumptions are not accepted by the group for the purposes of analysis. Therefore the entire analysis is rejected.

5. The presentation of the problem and the alternative solutions and their implications leaving to the public the job of appraising the policies in the light of their own criteria.

This is the approach that, it seems to me, we must use in the policy area in adult education. The answer to every public policy issue hinges on both facts and value judgments. In our society these value judgments must be left to each individual, and our function as educators is to supply the

economic and physical data that bear on the question and assist in showing the economic and social consequences of various policies.

Many times in public policy, the question of what alternative you may be for turns upon the acceptance or rejection of an economic principle. In such cases it is tremendously important that, where possible, we show the data so that the individual may discover and judge for himself the validity of the principle. When this can be done, you use economic data for the purposes of demonstration the same as you might use plots of oats or corn to demonstrate certain agronomic facts.

For example, you may use a table effectively if you wish to establish the fact that reducing the supply of meat changes the price paid per pound but does not materially increase the total amount consumers will pay for the red meats. By showing the disposable income and the per cent of disposable income spent for meat, you establish what does cause changes in income for meats. By showing total dollars spent for meat, pounds consumed, and prices paid you have the necessary data to examine the proposition. In presenting such data, the period should be of sufficient length so as to avoid the question of the association resulting from chance. The data should be shown in terms the farmer can understand. The figures should be shown in millions or billions and not carried out to the last decimal to keep them comprehensible. The source should be shown so that the figures can be varified.

The data might be shown more effectively to a statistician by a number of statistical techniques. To the layman, however, the working out of a complicated formula is an act performed in the dark. He cannot examine it, and it is not as effective in teaching. He must accept someone's word for it.

It is a great advantage with these controversial issues to use economic data to demonstrate a fact or principle. It is more effective than for the economist to draw the conclusion and present it to the audience as his statement. When the audience discovers the fact for itself and can discuss it as impersonally as they would an oat variety demonstration—rather than a statement of some individual—much more progress is made in learning.

Economic Data and Farm Management

Now let us turn to the matter of presenting economic data in connection with our farm management programs. In this area, our approach has not been subject to as severe a criticism as it often has in the policy field, but I think many times we have been just as wrong. We have set up in our own minds the unstated criteria that making the most money is the final objective for every farmer. This has not been true. Instead of the one farm organization that made the most money, the farmer has been

interested many times in one that gave less than the optimum returns but fitted better certain of his other social and personal objectives.

Therefore, what I am trying to say here is that our job ought to be the presentation of economic data and economic analysis to show the farmer what different types of organizations on his farm would do for him. He is the only one who can choose which of the alternative ways of operating the farm fits him best. In our farm management work in Indiana, we have come more and more to the budget approach and to assisting the farmer in working out several plans rather than one plan and to providing him with the data for working out several plans. Just as in policy, we find that the presenting of economic data for the group to analyze is much more effective than for us to tell them the answers. There is nothing so effective as providing the economic data in a simple form and then setting up the environment for the individuals to discover for themselves a new truth.

We find that the farmers in most areas in central Indiana should keep their small grain acreage to the minimum necessary to switch from row crops to legumes. We could tell them that this is what the data show. It is not as effective, however, as having the farmer examine a table. They can see the returns per hour from the different crops. They can discuss and appraise whether the data look right for their farms. They can disagree with the table without disagreeing with the speaker's statement. This is the way the physical scientist presents his data. It is a real problem, however, to get the data boiled down in simple, understandable form. And, finally it is a problem to limit the data to the critical issues.

One of our other problems in farm management is to work out simple rule of thumb procedures for the farmer to analyze his business. For example, in calculating the feed requirements for a farm, we use 200 bushels of corn or its equivalent for a sow raising two litters a year. We formerly started by working out the feed requirement for each sow, the male hog, and each pig. From the practical standpoint it is not necessary. It is like sandpapering a fence rail. There may come a stage when the farmer wants all the details. There are many short cuts in budgeting if we will only develop and use them. You may say these measures are too crude, but it is better to have crude guides used than refined guides unused. They help to arouse interest and they may be used in general meetings.

Economic Data and the Outlook

In outlook work the farmer wants to know what is going to happen. We have all had enough experience to know that we cannot consistently tell him correctly. We do know that we can give the farmer enough economic

facts and principles so that, as the course of economic events unfolds, he can come nearer to appraising what will happen. If certain events follow or appear likely at the moment, we can tell him what is likely to happen. However, if certain factors change, he is lost if we have not taught him the process of how to appraise the problem. Our job, therefore, in outlook is to supply the farmer with economic facts, help to teach him how to analyze them, and then to go through the process with him at the given moment. Economic data properly assembled in tables again make economics more real and understandable. They show him the relationship between certain factors in a qualitative manner.

The fundamental thing that we all are doing is to try to raise the economic literacy of the general public. We do it by teaching economics and economic reasoning in connection with a particular problem, such as a public policy question, a farm management question, or an outlook question. The presentation of economic data is an effective tool in teaching principles and in teaching the reasoning process that one needs to go through in making a decision. It seems to me that insofar as possible we should strive in all of these areas to demonstrate with economic data the results of certain courses of action and leave to each individual's judgment the course that fits best into his philosophy of life and economic and social position. Too long we have leaned towards giving advice which was based on both our economic analysis and upon our own value judgments instead of the farmer's. They could not always be right for him.

SPECIAL PROBLEMS IN AGRICULTURAL ECONOMICS EXTENSION

Chairman: Joseph Ackerman, Farm Foundation, Chicago

SPECIAL PROBLEMS IN AGRICULTURAL ECONOMICS EXTENSION IN THE NORTHEAST

KENNETH HOOD

American Farm Bureau Federation, Chicago

AFTER more than 20 years of agricultural extension work in Pennsylvania and the Northeast, I have joined the Chicago staff of the American Farm Bureau Federation.

I find myself in a reminiscent mood. I've enjoyed these eventful, fast-moving years of extension work. The travel, the meetings, the conferences, the people, the almost revolutionary course of economic events of the last two decades are now passing in review as I think of these production years spent trying to help farm people adjust their methods and thinking to the constantly changing economic world.

Today, I do not want to talk about the accomplishments or satisfactions of agricultural extension work, but about some of the many special problems that have arisen during my experience in the field.

Inadequate Research. One problem, which is being rapidly corrected at Pennsylvania State, is the inadequacy of basic research in all the economic fields where we are expected to service farmers. When a problem arises and research answers are not available, we have to make hasty inadequate extension surveys, draw upon information available from other sources, but frequently not applicable to our local problem, or to exercise judgment without too many facts. As our research departments expand, it will be possible to delve into more areas of study, to gear research, at least in part, to answering economic questions that arise in the field and to make research findings available as quickly as possible.

At Pennsylvania State, we have one man devoting full-time to research in extension. So far this work has been—study of extension methods and results.

Too Many Amateur Economists. There is probably no field of work in agricultural extension that is more plagued by amateurs than is economics. Everybody—the politician, the feed dealer, the rural minister, the dairy plant fieldman, the subject matter specialist in extension, the farm editor, the radio announcer and even the farmer—freely expresses himself on all phases of our work. Sometimes it's hard for people to recognize the specialist. The answer to this problem is to be so well informed, so accurate and so skilled in the presentation of our material that people

will come to think of us as the best source of good reliable scientific agricultural economic information and advice.

The "Crystal Ball" Complex. Unhappily, many agricultural economists are considered economic prognosticators rather than careful analysts of economic conditions and appraisers of probable future trends. We are not prophets. We are analysts. We don't expect to be right all the time because we are dealing with unpredictable weather, human nature, unforeseen political forces, and an ever changing international scene. Let us dispel forever the misconception that we can foretell the economic future with the same accuracy as the chemist can predict the result of combining two known compounds under controlled conditions.

Plethora of Agricultural Economic Information Unrelated to Local Conditions. For economic information to be most helpful to farmers, it should be interpreted in the light of the local, state, and regional situation. This is why we have for years prepared a State Agricultural Outlook report which frequently does not agree entirely with the national outlook statement. This is why we have had an R. M. A. state project on the "Interpretation and Analysis of Economic Information" at our institution for several years. To be of the greatest service, we must be quick to bring farmers the latest and best information, interpreted to apply to their own situation.

Too Many Poorly Trained Specialists. This is no criticism of the extension economists and marketing specialists in the Northeast who are doing the best they can with a vastly complicated job becoming more difficult every year. This is just a plain statement of fact arising largely out of our expansion program under R. M. A. We have marketing men who don't know the product with which they are working and who are unacquainted with marketing process after this commodity leaves the farm. We have extension economists with inadequate backgrounds for the skillful analysis of economic conditions. Many are learning on the job when they should know the job before they start. In time, conditions will get better if extension can keep most of their economists from leaving extension for jobs in other fields. My plea is a recognition of the fact, particularly by deans, extension directors and other administrative officers, that good extension economists come high but are worth every cent they cost. We need further incentives for additional training of extension economists who are on the job.

Economists Are Too Dry and Uninspiring. These are not my words. But I've heard them so often from county agents, subject matter specialists, farmers, and even housewives and business men that I believe in far to many cases it is true. We have a subject which can be dry and un-

interesting. But it also can be the most appealing subject in the whole project-summary of agricultural extension if we get down to earth, dress up our material, and make full use of visual aids, good writing, and effective speaking. This is a challenge that we cannot afford to ignore.

Economists Should Be Specialists. I appreciate that it is impossible for some of the smaller states in the Northeast to have enough agricultural economists for each to be a specialist in a particular field but I do feel it is an ideal situation.

Marketing Economists Need More Mobility. A marketing job does not end at county or state lines but in many states it is almost impossible to follow commodities to the market because of the strict limitations on out-of-state travel. The regional approach of some of the extension R. M. A. projects may be a partial answer to this. Regional marketing conferences and workshops held annually will also help.

We Are Skimming the Surface in Marketing. For years, the major portion of our marketing work has been with farmers and farm organizations. We need now, as some states are starting to do, to emphasize work with wholesalers, retailers and consumers. Today, as far as marketing is concerned, we are in the ante room of a tremendous unmapped cave. There is no end to new effective work that can be done in this field.

Subject Matter Specialists and Marketing. In many states, the subject matter specialist wants to assume the responsibility for marketing work. They know the people and the commodity but frequently they don't know enough about marketing to do an effective job. I believe the marketing specialist should know more about the commodity with which he is working. He should work with the subject matter specialists but he should be in the saddle and responsible for the marketing work that is done. In some states, this is a major unsolved problem in the field of agricultural economics extension.

If time were available I would like to discuss the need for more economic training for county agents, home agents, subject matter specialists, and administrators. I would like to consider ways and means of improving our techniques. I would like to dwell on the very important topic of consumer education in the Northeast. Finally, had I the time, I feel it would be profitable to discuss the professional future of the extension economist. He writes no books. He has no long list of startling research results. He spends much of his time in writing, traveling, speaking, holding conferences and giving special economic assistance to individual farmers. He works his head off and gets to be loved and admired by people all over the state. But can he advance professionally as fast or as far as the research worker and the teacher? This is another major problem in the minds of many of our extension economists.

SPECIAL PROBLEMS IN AGRICULTURAL ECONOMICS EXTENSION IN THE NORTH CENTRAL AREA

ALBERT R. HAGAN
University of Missouri

THIS statement is a summary of the problems listed by extension economists in the North Central states. We have attempted to approach the topic not only from the standpoint of farm problems, but also the difficulties encountered by extension economists in assisting farmers with those problems:

1. *Ever-increasing Capital Requirements.* This includes both the increased amount of capital required under present farming conditions, and the shift in ratio of operating capital to total capital.
 2. *Adjusting the Farm Business to Maintain Net Income under Conditions of Stable or Declining Prices and Increasing Costs.* A part of this general problem is the matter of increasing volume in areas where acreage cannot be expanded under present conditions.
 3. *How to Use New Production Techniques.* This is particularly true on the smaller farms where volume increases are so small that higher cash costs are a limiting factor.
 4. *Adjusting Farm Operations to Meet Changing Economic Conditions.* These include:
 - (a) Land use—the economics of grass-land farming.
 - (b) Application of fertilizer, water management, and other soil improvement practices to get higher and more profitable yields.
 - (c) Adjusting livestock production—place of beef cow herds in Midwest agriculture.
 5. *Tenure Problems.* Also a factor is the practice of transferring farms to sons or other members of the family.
 6. *Labor Problems.* How to compete with industry for competent labor.
- The main problems dealing with the job of extension education in the field of agricultural economics include:
1. *Teaching Farmers, Farm Leaders and County Extension Personnel the Importance of Economic Information.* How to get and use this information. Most of our county extension agents have very little training in the field of economics, and, as a rule, feel less competent to assist with economic problems than they do when assisting farmers with production problems.
 2. *How to Teach the Art of Farm Management.* Agricultural economists, as a rule, have done a much better job in teaching and demonstrating the principles than they have the art of farm management.
 3. *Establishing and Maintaining Close Working Relationship with Research Personnel.*

4. *Need for Techniques to Eliminate Delays in Getting Short-run Outlook Material to Farmers.*
5. *Service-type Associations.* Included would be groups such as balanced farming rings in Missouri and farm management associations in Illinois, Iowa, Kansas, Minnesota, and Wisconsin. Should they be expanded or restricted? Why?
6. *Preparation of Materials.* How much time should be spent on letters, bulletins, circulars, leaflets, radio, TV, charts, slides, movies, etc?

SPECIAL PROBLEMS IN AGRICULTURAL ECONOMICS EXTENSION IN THE SOUTH

J. W. FANNING
Georgia Extension Service

THE special problems in Agricultural Economics Extension in the South grow largely from the impact of rapidly changing agricultural systems.

A good Georgia farmer expressed it by saying "Things ain't like they used to be and never was."

A lot of changes and many problems can develop from the loss of 3,500,000 acres in cotton such as Georgia experienced in the past 35 years. Also the 16,000,000 fewer acres of cotton in the South have given great concern to our people in many fields heretofore not considered important.

The South now gets about 63 per cent of its cash farm income from crops compared to 80 per cent in 1924. Livestock, which provided one-fifth of the cash receipts in 1924, gave 37 per cent of all farm income dollars in 1950.

Even in the Southeast the change in pattern of farm income has been far-reaching. Crops now give 73 per cent of the cash as compared with 86 per cent in 1924. And livestock, which returned 14 cents out of each dollar in 1924, now provides 27 cents.

For those who are familiar with economics and farm management, it is not difficult to visualize the problems which people are facing in adjusting to and developing these newer systems of farming. And to add a few more figures, the farm population in the South in the past 30 years has gone down 27 per cent. Tractors have increased 22 times while we were reducing our horse and mule population 40 per cent. The number of farms has declined 10 per cent, yet all land in farms during the same period has gone up 16 per cent. In 1920, we had 17 per cent of our capital investment tied up in working capital but this had increased to 21 per cent in 1950. Our per cent of tenancy has gone down.

Extension workers in agricultural economics have followed these changes with more than a passing interest. Questions frequently arise before answers become available. Problems confronted in these adjustments are growing fast and furious and are by no means solved. It's not possible to list them all. It's even difficult to pull a few out and call them special. But in order to stay within the eight minutes allotted, I shall attempt to call your attention to some of the problems in economic extension which, in my opinion, rank pretty high on the list in importance.

1. *Enterprise Combination.* The tearing down of one system of farming presents problems of building another. One of the great problems in

Southern agriculture has been the building of a balanced system of farming carrying a reasonable and practical diversity from a wide variety of enterprises.

Changing prices constantly bring new conceptions of the income producing ability of enterprises. Along comes a conservation wave and we set off on another trial run in enterprise combination. Our Southern farmer has had plenty of free advisors in past years, all of whom seem to have different ideas. Sometimes it's pretty difficult for an agricultural economist to get straight thinking on this matter of enterprise combination.

2. *Capital Accumulation and Management.* One of our Georgia farmers operating 172 acres of land is worrying considerably because his capital investment now approaches \$40,000 or more than \$230 per acre. The machinery investment on this farm exceeds \$12,000. He has a 50-50 division between working and fixed capital.

This man wonders himself at times how he accumulated this large capital investment. He is more than concerned about its management in producing adequate income to justify it. As a group of farmers who always have been undercapitalized find themselves facing the possibility of accumulating large investments, the problem of how to build this investment safely and manage it efficiently becomes a tremendous problem. It is very real in the field of economics extension work.

3. *Rental Arrangements.* Landlord-tenant relationships have become extremely complicated with the introduction of machinery, livestock, soil amendments, high fertilization, and intensive production practices. These developments have placed tremendous emphasis upon this problem of rental arrangements, including inputs and outputs for both the owner and the tenant. There are many questions in this field which experience has not yet answered and which we are having to deal with somewhat experimentally. In Georgia I expect we presently have more requests for assistance in this field than in any other.

4. *High Production and Dollar Volume per Farm.* Many farmers in the South feel satisfied with a rather high dollar volume per farm that, to be perfectly frank, is not backed up by a sound production program. Much of the large dollar volume is secured through higher prices and not through a sound adjustment in the business that does provide a lot more stuff to sell than that farm produced a few years ago. It is not an easy problem to handle, particularly on cotton, peanut and tobacco farms but it is one of a fundamental nature.

5. *Quality and Adequate Preparation for Market.* Unfortunately, a high

diversification of products from a farm is not as conducive to production of quality products and their adequate preparation for market as is true of the farm producing a specialized commodity. This is one of the great problems in the field of marketing. Unfortunately, many of the developments in recent years with favorable prices have not been as conducive as they should be in placing the proper emphasis in this field.

6. *Farm Policy Viewed Objectively.* Ever since the proposition that we could have more by producing less was expounded, in the South the matter of price has become a matter of politics for certain commodities. It is extremely difficult under these conditions to view objectively farm policies as they relate to cotton, tobacco, peanuts, and some other commodities. It is not an impossible problem but it is an extremely difficult one with which to deal.

7. *Adequate Time for Economic Work.* One of the great problems with which extension economists in our section are faced is adequate time to do economic work. It seems that the training of this man is such that he is prepared for a multitude of responsibilities and the economist is often called upon to discharge so many different duties that he has trouble finding time to care for his own job. I guess in a way this could be classed as a compliment, but in other respects it is preventing the proper time and consideration being given to the very real economic problems.

SPECIAL PROBLEMS IN AGRICULTURAL ECONOMICS EXTENSION IN THE GREAT PLAINS

LYLE M. BENDER
South Dakota State College

TAKING one's bearings and choosing one's course involves a great many considerations. Physical, technical, political, economic, and social considerations seem to me all a part of the complicated process. A lot of our problems are external in nature—being imposed on our region by the United States economy and world wide developments. Many are of an internal nature—being imposed on our region by the climate, resources, location, stage of technology, and organization existing within the region.

In the preparation of the following few remarks, I am greatly indebted to many whose ideas I have in some way incorporated in this paper and especially to fellow economists in the Northern Great Plains. I have had to be selective and consequently know that I have touched only upon some of the pertinent problems.

1. *What Are Future Prospects for Terms of Trade in Our Region?* The products which our region sells to people elsewhere will not buy as much in the future as they have in the immediate past. Prices for farm products and raw materials will fall relative to industrial and consumer goods and services and transportation. We already have an idea of what can happen in a period of full employment. The terms of trade have fallen by nearly a fourth and they are likely to continue adversely during the new few years.

A whole set of special problems will then confront us. They will range over a wide area. The major problem fields will include: agricultural price and income policies, agricultural production, marketing and storage policies, interregional competition, monetary and fiscal problems, trade restrictions, expanding market news information, and others.

Our job is to get accurate information to people and groups of people. Such information should include facts about the problems, means of solving, and consequences of alternative solutions. We must be close to our public's interests if we are to take advantage of a favorable climate of education. People learn more quickly when they have a ready made interest in a subject.

As an example of one of our efforts in this field in my home state is some work done on inflation and deflation. A popular pamphlet was prepared according to the outline mentioned above. Copies of this pamphlet along with suggested uses were distributed to key people that "talk to a lot of people." Radio and news stories were used to arouse interest in the

use of this pamphlet. Large supplies of the pamphlet were placed in the county extension offices. We made our services available for talks to state or area groups. Our main efforts are to encourage county agents and others to "talk" this subject themselves.

2. *In What Ways Will Economic Progress Affect This Region?* We might approach this question from several aspects of economic progress. For our present purpose, the growth in output per head and the rise in real income that such growth will bring is more important. Suppose that our growth during the '50's continues at a rate of two per cent a year. Would this bring a corresponding increase in the demand for agricultural products by 1960?

For our region it probably would not do so. As income per head rises, the amount of agricultural products demanded per head will hardly keep up. Livestock and poultry products and fruits and vegetables will fare better than crops. If we throw world economic progress into the picture, the future demand becomes more complex and probably less favorable from the standpoint of wheat.

Our region is an important producer of livestock. Yet, in 1950, it was selling more crops than it was in 1940. Some favorable adjustment toward livestock already has taken place since the mid forties. This problem is still of major importance since wheat, dried beans, and potatoes bulk large in cash crops. The demand per head for these crops does not increase as fast as real income per head.

Out of this particular situation a number of problems appear. The major problem fields include agricultural production and marketing adjustments, international economic and social problems, land use and conservation policies, and credit policies. In addition, we face the problem of properly integrating discussions of these problems with other broad problems and problems of individual farmers and ranchers.

As a means of bringing the problems of production and marketing adjustments along with agricultural productive capacity down to workable levels, we are attempting in South Dakota to break down our work in these fields to our seven agricultural areas.

3. *How Stable Is the American Economy Likely to be During and After the Fifties?* Here we step into an unknowable field. There is no way of definitely telling what may be ahead. Perfect stability is impossible. General over-all stability may be a possibility. We have a great deal more knowledge of our economy than ever before. Perhaps there are enough counter-cyclical devices, built in and otherwise, that may avert the kind of mass unemployment we experienced in the thirties. Our recent past experience indicates this possibility.

In spite of the tools available, we chance a strong possibility of sudden drops in effective demand and periods of significant unemployment.

Stemming from this general proposition, a major problem field will center around an explanation of our economy and how it works. Included here will come such topics as economic growth, stability, and equitability. The broader aspects of outlook information must be given more emphasis along the lines of business and consumer demand prospects, consumer spending, fiscal factors affecting private demand, and private and public investment prospects. The means and consequences of the various built-in stabilizers must be included.

We shall now turn our attention to some of the internal problems of our region and its farms and ranches.

4. *How Will the Great Plains Compare in Over-all Efficiency in Agriculture Compared to Other U.S. Agricultural Regions?* Is it unreasonable to expect that this region will stand comparatively high in efficiency even after allowing for good and bad years? I think not. Certainly our region will be exceeded by the general Corn Belt and possibly by the South in some fields. However there are many reasons to expect improved efficiency ratings in the Great Plains. Among them are: (1) our agriculture has achieved a better combination of land, equipment and labor than it has had; (2) less excess labor and under-employment exist today; and (3) most of our people are much more mobile than they have been. On the other hand, there are some factors that tend to slow down efficiency. If the opportunities for jobs elsewhere were to diminish, the accumulation of excess labor would rise rapidly. In some parts of the Plains, the number of farms is beginning to increase and size decrease. Some farms and ranches are becoming over-mechanized.

To be of most assistance to farmers and ranchers and to make the best use of available resources, some effort must be made to provide efficiency information on a smaller basis than the region. Working toward this end, we in South Dakota are preparing production indices for the state and by agricultural areas where possible. From this and other sources of information we hope to develop efficiency information on production per worker, per unit of crop and livestock production and per dollar invested. Knowing where we are we will be in a better position to extend maximum help to our farmers and ranchers.

5. *Are Conditions Favorable to a Rapid Industrial Development Within This Region?* The Great Plains is more dependent upon agriculture for income than is any other region. This condition existed throughout the 1940's. In South Dakota from 1940 to 1950 agriculture increased in im-

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portance, manufacturing declined slightly, while the trades and services increased slightly.

Judging from partial information, industrial developments during the past decade have not brought about any gains for the Great Plains relative to other regions in the U.S.

Looking toward the rest of this decade and for a little distance beyond, industrial developments probably will not be enough to give our region any appreciable edge. Under emergency conditions or unusual discoveries of important raw materials, some development will take place. With the event of irrigation and power development, some small industries, mainly associated with agriculture, will spring up and existing ones will expand.

Interest is running high in some local circles on industrialization potential and some of our attention should be bent that way. Such activities would consist of discussion of major factors affecting industry and their relative importance. A pool of useful information is coming from our colleges, universities, and the Natural Resource Commission.

6. Importance of the Highly Irregular Distribution of Income over Time, Combined with Uncertainty As to Its Sequence of Occurrence.

This is the crux of the big problem in the Great Plains. Part of the problem, price instability, was dealt with at the beginning of this discussion. The second part of this problem may be put in the form of a question. Will a run of bad years, when they return, upset the economy of our region?

The climate is for all practical purposes unalterable. Men of the Plains are still in the process of developing new ways of living with the effects of fluctuations in weather. I will dwell only on the farm management phases of this problem which include what the farmer or rancher may do himself and what aid he may get from certain institutions.

The goal of the operating Plains farmer or rancher may be one or more of the following: survival, adequate income with minimum of work, and maximum net income. He has three major means open to him to help in gaining individual stability. One is flexibility in production, inventory of livestock and feed, and cash reserve management. Another is crop insurance. The third is access to suitable credit. At any given time the last two means represent conditions beyond his control. Yet over time he has a fourth means of achieving his survival and income needs by participation in group action to improve outside or institutional arrangements to help him. It is our job to help him make the best use of these means.

Another set of special problems centers around the young operator starting out in farming or ranching. Educational programs required include the best time to buy a farm, capital needs, equitable leasing, or

share arrangements including father-son deals, and flexible loan arrangements.

The retirement of many farmers and ranchers brings forth another set of problems dealing with legal transfers, gradual retirement with adequate income, maintaining the farm in the family, and the like.

Other special problems deal with the economics of conservation and irrigation.

In my state, the main means of bringing information on the problem of farm and ranch income stability is through the use of model farms and ranch plans. Here we show the unit as it actually is, including organization, inventories, and operating statement. Budgets of possible alternatives are used to indicate means of solving the problem. Such information will be distributed through voluntary farm planning groups, rural youth, and crop and livestock organizations. We believe such a method can be used in connection with capital needs, irrigation, conservation, and leasing problems. It also will support work being done on problem two.

In summary, if we are to perform our function well, we must not be confined to the narrow definitions of farm management and marketing but must also roam the field of public policy. A balance of activities is essential. They should be keyed to the public's current interest. Above all, we must treat our discussion of problems and their solutions as objectively as possible. At the same time, we must not fear the passing of a judgment because one who claims to be well informed on a subject usually has a judgment.

SPECIAL PROBLEMS IN AGRICULTURAL ECONOMICS EXTENSION IN THE FAR WEST

ARTHUR J. CAGLE
State College of Washington

I THINK most of the problems concerning agricultural economists in the Far West are quite similar to those in other areas of the United States. There are, however, differences in the relative importance of many of the problems.

Some of the causes of these differences are the development of new farming areas; rapid increase in population in the Pacific Coast states; sparseness of population in some areas; more recent settlement and development of the West; and great distances to market for some major products.

This paper will outline some agricultural problems to which economists in the Far West are giving special attention.

1. *Economics of Resource Development.* This is one of the major special problems in most of the Far Western states, and offers a real challenge to both research and extension workers.

A. Development of irrigation in the West is number one in resource development. Some major problems in this field for extension economists are:

- (1) How fast should development proceed?
- (2) What are the economic limits?
- (3) How should costs of development be allocated?
- (4) Economics of sprinkler irrigation versus other methods of irrigation.
- (5) Planning the size of farming units.
- (6) Patterns of rural settlements.
- (7) Financial aid for new settlers.
- (8) Types of farming.
- (9) Land appraisals.
- (10) Allocations of repayments by class of land.
- (11) Farmstead and field arrangements.
- (12) Complete farm and home planning.
- (13) Markets for the additional farm products grown in new irrigation districts.
- (14) Leases on farms while they are being developed.

B. Land clearing in the West is another important phase of resource development. There are millions of acres of cut-over and second-growth land to tempt people that want the cheap farms. Most of this is only suited for forest production.

- (1) One of the main jobs is to try and guide settlers from going into the area that would be submarginal for farming.
- (2) Many of the problems are the same as those listed under A. above.

2. *Public Policy.* Some public policy problems of special interest and to some extent peculiar to the West are as follows:

- (1) Would valley authorities, such as the proposed Columbia Valley Authority, bring about desirable changes faster and more efficiently than present methods?
- (2) Hells Canyon Dam versus five small dams.
- (3) Public utility districts versus private ownership.
- (4) Higher freight rates on many important farm products of the West such as fruits, vegetables and wheat.
- (5) Land and water resource development relative to national welfare.
- (6) Administration and management of public lands.
- (7) Zoning rural areas to guide future farm development.
- (8) Changes in foreign trade that affect Western agriculture.
- (9) Rain making: the wheat farmers against the cherry growers.

3. *Marketing.*

A. The rapid increase in population in several Far Western states has caused special marketing changes. There has been a population increase of almost 50 per cent for the three West Coast states and Arizona in the past 10 years. Some examples of important market changes are:

- (1) Pacific Coast states have changed from important exporters of eggs to importing several hundred carloads annually.
- (2) The seven states of the Pacific Slope not long ago were concerned with future milk surpluses but now are deficit by about ten per cent.
- (3) Rapid change of population is consistently changing methods of marketing—fruits and vegetables and many other products, as well as eggs and milk.

B. There are expanded markets in Alaska and the Orient.

- (1) An example is the large amount of Western wheat exported through Pacific Coast ports. This has caused our wheat to be relatively higher in price compared with other parts of the nation. This has changed the economics of our livestock feeding program.

In conclusion, our main problem in agricultural economics in the Far West is that we do not have enough personnel. We do not have enough people to do an adequate educational job on even a small percentage of these special problems or the usual run of economic problems that make a much longer list.

TEACHING AGRICULTURAL ECONOMICS AT THE SUB-COLLEGE LEVEL

Chairman: T. K. Cowden, Michigan State College

THE PLACE OF ECONOMICS IN AGRICULTURAL EDUCATION PROGRAMS

MILO J. PETERSON
University of Minnesota

IN AN undertaking as vast in scope and complex in operation as education in the United States, there is constant need for periodic evaluation. This evaluation should lead to clarification of objectives, revision of methods and procedures, and utilization of all resources in a more efficient manner. The opportunity I have to meet with this group is significant because it provides for these things. I would emphasize our common objectives and explore some of the way in which we might work toward their attainment.

My assignment calls for a discussion of the teaching of agricultural economics at the "sub-college" level. I wish I knew exactly what that is! Lacking the ability (or temerity) to attempt clarification of the assignment does not give cause for dismay. We can define the objectives of vocational education in agriculture as that program is conducted in the community high schools of our nation and assume that this meets the challenge. Vocational education in agriculture has an economic base. It is intended to assist farm people to farm better so they live better.

A modern program of agricultural education at the secondary school level deals with three major groups of people. They are (1) the established farm people of the area, (2) the young farmers—those who are not in school and not yet established in farming or some other occupation and (3) the boys studying agriculture in the high school.

This program is rooted in the community school philosophy which holds that the school must provide educational opportunity for *all* people in the school area. The community school philosophy recognizes the fact that only a small percentage of our population will attend colleges and insists therefore that the local community high schools provide educational opportunity. It is in direct conflict with the "traditional" or "ox-cart" school of thought, which holds that the high school is really only a preparation for college, and therefore must be geared entirely to the needs, interests, and opportunities of those who will leave the community. A deeper conflict involves the failure of the traditional school of thought to accept responsibility for providing education for those not "regularly enrolled" in the all-day high school program with all its attendant rigidity and admin-

istrative limitations. Farm people, and those interested in farm progress, have a stake in the community school. Agricultural economists also should be interested, for it provides a means of meeting responsibilities that as yet have never been adequately met or squarely faced.

Agricultural Economics in the Adult Education Program

The objective of adult education in agriculture is to help increase the efficiency of farm operation and raise the level of living. In the evolution of this part of the vocational agriculture program, there has been a growing recognition of the need for basing the instruction in farm management. Certainly this is a natural conclusion, particularly if we define farm management as that field of study dealing with the organization and operation of a farm business from the point of view of greatest continuous profit.

A properly developed adult education program in agriculture has certain clearly defined characteristics. It is a continuous program operating throughout the year and from year to year without interruption. It utilizes a variety of teaching techniques including group meetings and discussions, field trips and tours, field demonstrations, variety trials, test plots, fertilizer trials, pasture improvement demonstrations, all manner of other visual aids, resource people with special contributions to make, and is limited in size only by the capacity of the instructors and the facilities available. Above all, the program is based on current problems of farmers. The instructional material is drawn in large part from the community and applied in its entirety to the farms in the community.

If the educational needs of established farmers are to be identified, they must be recognized for what they are. Interest is highest in current problems requiring decisions now or in the near future. Omar Khayyam recognized this in his reference to "the brave defiance of distant drums." But the outstanding characteristic of educational needs of established farmers is that they are farm management problems. That, after all, is the major problem of a farmer. And unless the program of instruction, both in groups and on the farms, is geared to the management needs, it is certain to fail in direct proportion to the lack of application in the day-to-day management problems of farmers in the community.

To meet this need at the grassroots level, a cooperative research and teaching project has been initiated in Minnesota. Much credit for the development of this project must be given to Dr. George Pond and Dr. Truman Nodland. Cooperating agencies include the Division of Agricultural Economics, the Department of Agricultural Education, the State Department of Education, the Agricultural Extension Service, and the Vocational Agriculture Instructors Association.

Objectives of the Minnesota project are twofold: (1) to provide data relative to the establishment in farming of young farmers and the management problems of farmers in different types of farming areas and of varying conditions as to tenure status, age, credit, resources, and marketing practices; and (2) to provide materials of instruction based on these data. The farmers cooperating in the project are members of adult and young farmer classes. They pay a fee of about \$25 per year for which they receive certain information and services not otherwise readily available. From the viewpoint of an agricultural educator, this arrangement presents an alignment of resources which cannot fail except for our own lack of vision. Granted a sense of urgency and a realization of the potential on the part of those involved, I predict the development of an adult education program in agriculture that has no equal in terms of real educational service to established farmers. It will be a dream come true.

Of course, such a plan has disadvantages. The opportunity to "pass the buck," the professional and human petty jealousies that could develop, the difficulty of proper distribution of costs, the possibility of mutual misunderstandings of objectives—all are problems that could hinder or cripple the undertaking. Let us recognize, however, that all of these are present in a program of inaction as well as in a project such as this.

The advantages of this cooperative approach to adult education are many. Only good can come from the pooling of resources for mutual benefit. New channels and resources will grow out of such associations, and increased opportunities for experiment and application. Above all, the chance to meet the educational needs of established farmers through a program backed by the local community school, the Agricultural Experiment Station, the teacher training institution, the State Department of Education, the Extension Service, the teachers association, and the farmers themselves, is almost breathtaking. This is the adult education program of the future.

Some specific outcomes of adult education in agriculture are: an understanding of the factors affecting farm profits; the skill to keep, analyze, and interpret farm records; the ability to use credit effectively; the ability to apply information and experimental results and probably most important, the ability to make decisions relative to crops, soils, livestock, conservation, marketing, and government policy in terms of the whole farm business.

These are a few specifics that contribute to the over-all objective of increased efficiency in operation of a farm business.

Implications for Agricultural Economists

It is always easy to sit back and point out how someone else might do

a better job. A sign hanging in a barber shop in Clemson, South Carolina, suggests the "worth" of such a procedure by proclaiming that "any fool can criticize and most of them do." It is therefore not in the spirit of criticism, but rather in a plea for help, that we draw here some implications for the professional in agricultural economics with reference to adult education in agriculture at the community level.

To you as to no other source, we must turn for assistance in this work. We in vocational agriculture can offer untapped resources for the securing of data and the channel for application of these data. There is no closer link to farm people in the educational transmission belt in agriculture than the vocational instructor in the community school. Have we exploited this relationship? Have we been content to teach college classes and publish bulletins and hope that somehow the information would trickle down and find application on the farms? Have we done all we could to improve the working relationships and channels of communication between the state experiment stations, the county extension offices and the agricultural instructors in the communities? Have we really given sufficient consideration to how we can be of greatest service to the farm people? Have those responsible for vocational agriculture sought your help? Shall we wait in our tents (or in ivory towers, as the case may be) until such time as our services can be made available with no damage to our pride? Gentlemen, the field of adult education in agriculture is a fertile one; let us cultivate it together.

Agricultural Economics in the Young Farmer Program

In every community there are a number of young men on farms not yet established in farming and not "regularly enrolled" in the day school program. These men are usually between 16 and 30 years of age and represent a variety of backgrounds. Educationally they may be high school graduates, dropouts, or those who never started high school. This group, which gave rise to the Young Farmer program in vocational agriculture, is perhaps the most important group in terms of the future of any community.

In the development of an educational program to meet the needs of this group, consideration must be given to their immediate problems. Of over-riding significance are two questions: Where will I farm? Who will farm with me?

Both questions have economic repercussions, but the first provides the clue to the place of agricultural economics in the Young Farmer program. A desirable program of education for these young farmers takes shape along three main lines. The first is economic-vocational, the second is social-civic, and the third is personal adjustment. Instruction is geared to help them locate farming opportunities; develop the ability to appraise a

farm business; apply the resources of farm credit to their problems; understand and properly select the right kind of partnership agreement, lease, or rental arrangements; develop abilities in financial management, records and accounts, insurance programs; and to carry out activities leading toward and into establishment. These are learning experiences rooted in agricultural economics.

When those of us who have answered for ourselves the most important questions of our lives are tempted to refer to youth as "the golden age," we are merely showing how much we have forgotten. If there is one stage of life that can be called more complex and difficult than any other, it is that period when we pass from youth to maturity.

It is a sad truth that this is also the period when our public school system turns its back and forgets. The community school philosophy demands that educational opportunity and guidance be provided for all people in the community. It can be rather clearly demonstrated that in farming communities, the secondary school cannot serve the community without providing suitable education opportunities for young men not "regularly" enrolled and not yet established. If there is a forgotten group in our public school system this is it. As of today, I believe the draft boards have been providing more vocational guidance for out-of-school farm youth than have the public schools or the colleges.

In essence, the Young Farmer instructional program helps young men become established in farming. As in any other education program, it is important that there be continuity; close personal association between teacher, young farmer, and parents; use of all available resources in the teaching program; and recognition of the school by non-school agencies as an effective channel for cooperative effort. As the young farmer passes through the stages of establishment his problems become more and more those of farm operation and management, and he gradually merges with the adult program. From start to finish, however, he and the teacher must draw heavily on agricultural economics for information and recommendations. The degree to which the resources of agricultural economics are made available to agriculture instructors governs in large measure the degree to which the educational objectives are accomplished.

Implications for Agricultural Economics

The concern of agricultural economists with the Young Farmer program depends on their conception of areas of responsibility. There are those whose major concern is with research, others must teach in the colleges and universities, and I suppose we will always have those who must administer departments and assist branches of the government. The extension economist, whose function is to carry information from where he is to where it will do most good, is a key person in the transmission of facts.

He can multiply his effectiveness many fold by working through agricultural instructors in the community.

Economists who teach in the colleges are responsible for training agriculture instructors in agricultural economics. Are we doing the best possible job for the good of farm people in the way we train teachers? Exclusive of students who major in economics, of course, is there another group of such strategic importance as those who will teach vocational agriculture? Have we accepted mutual responsibility for pooling our resources in a cooperative effort to provide education opportunity for young men becoming established in farming?

In the past there have been certain half-hearted efforts to delineate areas of responsibility between the public schools and the Cooperative Extension Service. This is in exactly the wrong direction. The effort should be directed toward more effective cooperative work for maximum use of all our resources for the benefit of the farm people. Anything that tends to separate agricultural economists from vocational agriculture instructors in any way is doing an injustice to the young farmers and to the public schools. Such action also tends to weaken and isolate agricultural economics from the application it should have in the solution of problems of establishment in farming.

Agricultural Economics in the High School "Vo-Ag" Program

Agricultural education for high school students shares with other phases of the program a dependence on agricultural economics especially in farm management, marketing, and financial management. A consideration of the areas of learning around which a modern program of vocational agriculture is built will put this in perspective.

Major objective of the program for high school boys is the development of an equity in a farming business, involvement in the total farm situation, and effective citizenship. This over-all objective is sought through organized learning experiences known as supervised farm practices. This area is specific for the involvement in farming and development of an equity in terms of interests, abilities, and opportunities of the individual.

Instruction in supervised farm practice takes place in the classroom, laboratory, shop, and on the farm. A well-balanced farming program for a high school student will be conducted in these areas:

1. *Skills and techniques.* The objective here is to master the skills and techniques necessary for the successful operation of a farm business in the community.

2. *Farm and home improvement.* The purpose of farm and home improvement activities is to make the farm and farm home a more pleasant, convenient and efficient place in which to live and work.

3. *Financial management.* The ability to use and manage money and

credits is the desired outcome. Instruction is provided in (a) savings to accumulate funds for future use; (b) credit—to establish credit and use it profitably; (c) investments, including insurance, to make money work for desired results; and (d) records and accounts—to keep, analyze, interpret, and apply farm business records.

4. *Production of farm products.* To be an efficient producer of farm commodities and to market them profitably is the purpose of instruction in this area.

It is around these areas of learning that the high school vo-ag program develops.

A common procedure in many high schools is to begin the instruction in the freshman class with a comparison of the home farms of the students and move from there to the development of the farm practice or supervised farming program. These farming programs constitute the most important part of the instructional program, both in terms of time and learning outcomes. Starting with the farms represented in the class obviously calls for an inventory as one of the first learning experiences. It means further that the instructional program will be geared to the farming problems of the community and will have application in the day-to-day farming experiences of the boys. This is the hallmark of vocational agriculture and it bears the imprint of farm management as an identifying characteristic.

Since the objective is to involve the boy in the home farm business, it is imperative that the parents be "dealt in" on the program from the start. A significant change in parent-student-teacher relationships is developing as a result of de-emphasis of individual unit ownership and a shift toward partnership on an enterprise basis early in the farming program. This approach opens new avenues of study relative to the transfer of equity in farming, share and partnership agreements, leases, and rental arrangements. Further study may well bring solution to the eternal problem of transfer of ownership of family farms.

A brief historical sketch of the vocational agriculture program for high school students would disclose that the general practice at one time was to teach crops and soils one year, animal husbandry one year, farm mechanics the next, and, if the student was still around for the fourth year, he was taught farm management. Obviously, no farmer, good or bad, farmed crops one year, livestock the second, did his farm mechanics the third, and spent the fourth year managing the farm. Only in colleges can we get by with this type of teaching. In the evolution of vocational agriculture for high school students, the concept of the whole farm business and involvement in managerial responsibility has come to the fore. It is not vocational teaching to teach *about* farming; vocational instruction in agriculture is teaching *farming*. This means that good pedagogy requires the

psychological rather than the logical approach. Pedagogical sins of mortal magnitude have been committed in the name of logic at both the secondary and collegiate levels. Neither economics nor education are exempt.

A difficult problem in preparing the program for high school Future Farmers is to keep the instruction meaningful without going "over the heads" of the students. It is hopeless to present a first or second year student with the Minnesota Farm Account Book, for example, and expect the lad to be vitally interested in it. He is interested in keeping production records and feed records and calculating rate of lay or pounds of butter fat from poultry or dairy cows if he can have a real stake in so doing. Such a start in keeping and analyzing farm records and accounts leads naturally to complete enterprise records and finally to the objective stated earlier of keeping, analyzing, interpreting, and using complete farm accounts. This process applies the principle of taking the learner from where he is to where he should be. We may well apply this same principle to our mutual problem of closer integration between the two branches of agricultural education we represent.

Any discussion of agricultural education at the secondary level would be incomplete without recognition of the Future Farmers of America. The emphasis placed by this organization on financial management, use of credit, conservation of productive resources, and cooperation for mutual benefit as bases of a sound farming program has contributed much to the attainment of vocational objectives.

Implications for Agricultural Economics

Every teacher of agriculture receives a number of publications devoted to economic information. Most of this material has a definite usefulness and some of it is useful for teaching without adaptation. A major reason for the failure to get maximum, or anything like maximum, use from this material is that it requires revision, reshaping, and in most cases, interpretation before it can be applied in the teaching program. This is no fault of the material or those who prepared it. It merely means that usefulness in teaching was not a benchmark in the development of the publication. Perhaps this has implications for those concerned with best use of economic information. In those states where subject matter specialists are employed, this problem can be solved. In some cases these men may be jointly employed by the Departments of Agricultural Education and Economics. In such circumstances, there is opportunity to provide material that has a considerably higher chance of "survival."

It may well be that we have not explored the rich opportunities in agricultural education at the secondary level for using economic information. Have we trained our teachers of agriculture to utilize available resources? Have we been too aloof from the "sub-college" needs and op-

portunities in agricultural economics. Are our efforts pointed more toward impressing our professional colleagues than at meeting an acute need in the educational program for farm people? Is this too cynical an observation?

Close to half a million farm boys will be studying vocational agriculture in 1953. Will they be provided with the kind of economic information that is meaningful to them?

Research Opportunities at the Community Level

Practically every vocational agriculture instructor is a graduate of a land grant college of agriculture. This means that every department of agricultural economics represented here has assumed partial responsibility for their training.

The other side of the coin reveals that research is the life blood of agricultural economics just as it is of any other field of study.

Have we capitalized on this situation in planning and conducting our research programs? Research in farm management, for example, has not suffered from lack of problems for study, but rather from lack of resources to obtain data. There are departments of vocational agriculture in every state, manned by well-trained instructors interested in closer working relationships with the research workers in farm management. Every day, these vo-ag men meet and work with farmers whose prime worry is farm management. This is not to presume that every teacher of agriculture is prepared to cooperate in economic research, but it is to say that this is a resource never fully explored or exploited for mutual benefit. My plea to agricultural economists is that we explore together the possibilities for more effective research programs through cooperative planning with men we helped train and who are now closest to farm people of all those in the education hierarchy.

Such cooperative planning would do much to improve the work in vocational agriculture and would, in turn, yield previously unavailable data for use by research workers in agricultural economics. It should be specified here that one of the most important returns educationally would be the more effective use of technical information from other subject matter fields in agriculture as well as from agricultural economics.

A Suggested Policy

The first step in a program to make agricultural economics more effective in helping farm people is to define a framework of policy within which we can operate. Any such policy will rest on certain basic assumptions or "facts of life." Some of these are stated here.

1. The local community high school district is the closest educational link with farm people. It also is the smallest unit of local self-government,

and therefore is the channel through which we must operate if we are to prevent atrophying centralization.

2. The basic problem of farming is adjustment to changing conditions, most of them economic. Farm management is therefore, the principle concern of agricultural education at the community level.

3. The fountainhead of information and the responsibility for leadership in the development of programs of functional education for farm people spring from the land grant colleges of agriculture with particular reference to farm management.

4. Unless educational programs for farm people have local application to immediate needs they will fail to command the interest and participation of farm people.

These "facts of life" suggest certain policies. For example, if we recognize the impact of vocational agriculture for what it could be as well as for what it is, more thought might be given to the training of instructors. In addition, it would become imperative that we develop resource material which has some chance of finding its way into the teaching program. This calls for subject matter specialists working with those in agricultural education to insure greater returns from our efforts. It implies further that there might be resources at hand for the improvement of our research programs. There also is the policy question regarding the development of an endless belt flowing from the departments of agricultural economics through the county extension channels to the local community schools and through them to the farms and farm homes of the country.

Do we have a policy concerning ways and means of maximizing our production in terms of benefit to farm people? If we do, it surely cannot ignore the community high school. If it does, we surely have a need for revision of the policy. Let it be our policy to look critically at the "sacred cows" born of expediency and hallowed with the moss of tradition.

As a practical matter, we should consider such changes as are in harmony with the philosophy and objectives to which we give allegiance. Those of us in the land grant colleges have no other excuse for drawing our pay than service to farm people. Our policies should be kept abreast of changes that we have helped to bring about in one way or another. Specifically, it is suggested here that we develop a policy of closer working relationships between agricultural education at the community level and agricultural economics. The basis for this suggestion is that by so doing we can be of greater service.

Suggested Next Steps

In suggesting some possible next steps, it should be made clear that

there is no ulterior motive to "adulterate" agricultural economics, but rather to bring its contribution to the highest potential. I am concerned with the farm family whose contact with people like us is so rare as to make us seem queer and different. We sow not, neither do we spin, yet we are always at hand to give advice as to how farmers might sow and reap to better advantage. In that connection, I would direct our attention to the teacher of vocational agriculture who is closer to the farm people than any of us and who is looking for our leadership and help.

Twenty years' experience as an agriculture instructor, agricultural economist, and teacher trainer has brought home the need for closer liaison and working relationships. There are no barriers to the development of these relationships except the inertia of all of us as human beings. No one likes to be different, I suppose, but only those who are make much difference.

If what I have said to you today strikes a spark; if there are sufficient of you who share the vision with me, I would hope for some concrete results. These may take several forms. At the state level, there may result other cooperative projects such as has been just recently initiated in Minnesota. The opportunities are unlimited.

At the national level, it may not be unreasonable to hope for the appointment of a joint committee representing agricultural economics and agricultural education to study ways and means of improving instruction in agricultural economics at the secondary school level. Surely the need is there and opportunity represents itself as need. Similar work in the field of agricultural engineering and mechanized farming has been mutually beneficial.

Such a step will not make everything simple and satisfying. On the contrary, we will all be surprised at the lack of homogeneity in our approach to the problem. But only by pooling our resources and working together can we achieve results. We need the active assistance of agricultural economists in developing the best possible program of education for farm people. This bold plea for help is based on a faith that agricultural economists are interested in improving this program at the community level and in utilizing all available resources in the most effective manner toward this end.

We are not doing as good a job in agricultural education as we should be doing. We ask that you share with us the responsibility for more fully meeting our objectives. I do not believe that agricultural economics has played its proper role in agricultural education at the community level thus far. That does not mean the cause is lost. To quote Samuel Johnson "the greatest benefit which one friend can confer upon another is to guard and excite and elevate his virtues." This has been my purpose here.

DISCUSSION FROM POINT OF VIEW OF FARM MANAGEMENT

RAYMOND R. BENEKE

Iowa State College

I agree with Professor Peterson that a considerable gap exists between the role agricultural economics ought to play and the role it actually does play in the vocational agriculture program. I happen to be familiar with the work in Minnesota and I know some giant strides have been made in recent years in Peterson's state toward integrating farm management training into the vocational agriculture program. You will note Professor Peterson has stressed that the initiative for more realistic training in farm management at this level should rest with workers in agricultural economics. I believe the success of the program in Minnesota is, in a large degree, due to the farm management people there having found a receptive and understanding ear among the leaders in the vocational agriculture program. I am not sure others of us interested in the same thing would be so fortunate.

I want to take a few minutes to examine the vocational agriculture program more closely and to indicate several points at which it suffers from a lack of integration with farm management principles. While my remarks are directed to the vocational agriculture program because it is the program at this level that I know the most about, much of what I am about to say would apply equally well to the work of the Extension Service with youth groups.

Efficiency in the use of resources and financial success in the highly complex farm business of today demands more than a careful adherence to recommended or improved practices. Skill in controlling disease, maintaining and operating farm machinery, selecting livestock, cultivating crops, and carrying out the multitude of other farm practices is not enough. Fully as important is skill in combining crop and livestock enterprises, allocating capital and labor among competing uses, working out leasing agreements, using farm credit, timing the production and marketing of farm products, and adjusting to farm risks. Professor Peterson observes, and rightly so, that interest among students is apt to be higher in day-to-day problems. We should be careful not to let the greater interest on the part of students and farmers in problems of this type blind us to the crucial importance of decisions that are made only once a year or even once in a lifetime. Decisions that lean the heaviest on training in economics are apt to be of this latter type. A consistently faulty record in making any of the important farm management decisions certainly will lead to financial mediocrity or failure in spite of a proficiency in the technical phases of farming. Every community has examples of farmers who are proficient in carrying out farm operations and in applying improved practices, but who are not financially successful because they cannot cope effectively with the crucial economic phases of their problems.

No greater challenge faces teachers of vocational agriculture than that of converting the student who thinks in physical terms and who is "improved practice and enterprise conscious" into a manager who weighs alternatives in terms of returns to the whole farm business. To do this, the study of technical problems must be integrated with a consideration of farm management principles. An integration of the study of economic with physical production relationships can help overcome the temptation to over-simplify farm decisions by leaning on strictly physical criteria or "rule of thumb" economics.

While we would find almost universal agreement on the proposition that a productive enterprise should be organized and managed to contribute to a maximum income for the farm as a whole, I believe vocational agriculture training is too apt to leave the impression with students that the important thing in farming is the attainment of a number of physical goals. As examples of the pitfalls to which undue emphasis on physical criteria sometimes leads, one may cite the divergence between maximum profits and attempts to maximize butterfat production per cow or pigs weaned per litter. As the output of butterfat per cow is pushed upwards, returns per added unit of feed and labor decrease. The inevitable result of indiscreet adherence to this physical criterion can only be to push production into the uneconomic range where marginal cost exceeds marginal revenue. Stress upon the attainment of a high average litter size may be in conflict with the maximum farm income where large litters are attained at the expense of limiting the size of the swine enterprise or where labor must be diverted from competing enterprises on the farm. Similar conflicts arise in planning the cropping system and conservation program on the individual farm if the emphasis is placed on minimizing soil loss per acre rather than maximizing long-run income from the land. In focusing attention on specific phases of the farming program, the vocational agriculture teacher is apt to give too little emphasis to the most important yield of all in the farm business, i.e. net output per operator.

The economic principles underlying the organization and management of farms for the most part are well developed and are set forth in an adequate manner in a wide range of reference materials. But methods by which the student can be taught to apply economic principles in making farm decisions need development and improvement.

Unfortunately, the methods that have proved so successful in developing manipulative skills and in teaching improved production techniques are inadequate in the farm management area. This is particularly true in the supervised practice aspects of the program. For instance, whereas the sow and litter project can provide an excellent exercise in selection, feeding and in disease and pest control, it does not provide training in making a number of the important management decisions involved in hog production. In most instances, sow and litter projects must be conducted on such a limited scale that students do not have an opportunity to get a realistic picture of the relationship between costs and size of enterprise. Many of these small enterprises are uneconomic if all inputs are charged at a market rate or are valued in terms of their opportunity cost.

One of the important management problems in an area where farms are multiproduct units involves fitting the enterprises together. The student who has only a sow and litter project does not face the problem of timing his production to avoid conflicts with other enterprises nor does he have to decide how to allocate feed supplies or limited capital and labor among competing enterprises. Crop production projects centered around an individual crop become even more unrealistic because of the complex rotation relationships existing among certain of the crop enterprises. Certainly the abandonment of the old idea that agriculture could be taught as four separate courses; farm crops, animal husbandry, farm mechanics and farm management, of which Peterson spoke, was a step forward.

Circumstances do not permit the development of supervised farming programs in the traditional sense of sufficient magnitude and diversity with most

students to give practice in decision making on a realistic "whole farm" bases. Therefore, traditional methods must be modified and new teaching devices developed if training in these important areas is to be effective. I like Peterson's suggestion that students be introduced to farm management during their freshman year through a study of the home farms of class members. This is not too early to begin acquainting them with the farm as a business unit and with problems of enterprise combination, timing of production, and allocating labor and capital among the many competing uses on the farm. Beyond this, I think, there are some possibilities for strengthening the supervised practice aspects of farm management teaching.

For instance, the use of a "class farm" may provide a decision making situation that at least has some of the aspects of a whole farm unit. Students have an opportunity to see the outcome of planning in which they have had a part. Such a method has the weakness that at best each student can have only a minor voice in decision making and it is costly both from the standpoint of the physical equipment required and the demands it makes on the time of the instructor. There are other devices, however, that do not have all of these drawbacks. Every community has interesting farms operated by capable managers that may be used as problem farms. Committees of students who are in their junior and senior years may serve as "advisors" to the farmer. Cropping systems may be developed and livestock programs fitted to them. Alternative programs may be tested through budgeting procedures. While the student under most circumstances would not be provided an opportunity to see the soundness of his decisions tested by actual application he is at least provided a realistic situation for study. The farm operator may also serve as a valuable teaching resource through acting as a consultant or resource person and criticizing the recommendations made by students.

In spite of certain drawbacks, perhaps the chief reliance for supervised practice in farm management should still center around the home farm. This would mean encouraging parents to give the student some voice in the whole farm set-up in addition to more complete responsibility for a small segment of the farm business which typifies the now traditional project. This is what Mr. Peterson is suggesting, I believe, when he speaks of the deemphasis of individual unit ownership and a shift toward partnership on an enterprise basis early in the farming program. As the student matures, definite family farming agreements can be evolved. Under present day conditions it appears that most young farmers will have to begin their farming careers under some type of family arrangement. Hence, sooner or later they will face the problem of developing effective working relationships with their families. Helping the student to secure a voice in the management of the farm business at an early age can thus serve the two-fold purpose of providing training in decision making on a realistic unit as well as paving the way for an eventual family farming arrangement as the first step up the agricultural ladder.

I do not think we should minimize the problem of overcoming some of the weaknesses that Professor Peterson and I agree exist in farm management training. I believe the solution to the problem in a large degree lies in the training of prospective vocational agriculture teachers. And it is in this area that we in agricultural economics can make the greatest contribution. It is certainly our responsibility to see that future teachers have a thorough understanding of farm management principles. It seems to me that both the people in education and economics should give greater emphasis to methods of teaching farm manage-

ment in the teaching training program. As things now stand, farm management courses are crowded with subject matter and there is no time to devote to these matters. I believe that there is something definite and vital to be taught in methods of teaching farm management and that a great deal more time should be devoted to this topic in methods courses. I might point out that there is precedent for this type of teaching in other subject matter fields. This is a job that can be done effectively only by a close working relationship between the people in education and economics at the college level.

DISCUSSION FROM THE POINT OF VIEW OF MARKETING

LEE R. MARTIN
North Carolina State College

What I have to say is not an exhaustive cataloguing of what is, or ought to be, or ought not to be, taught in secondary schools. Neither has any strenuous effort been made to restrict myself to the field of marketing, principally because I don't know exactly where the boundaries of that field are. Offered here are a few suggestions on what might usefully be taught to high school students and to adult students at a level below college. It should be stated at the outset that any decision as to what topics in marketing might be included in the training of students not going on to college should be reached only as a part of the decision of what economics should be included.

As far as the individual to be trained is concerned, preparation for three types of activities might well be stressed. These are:

- (1) His role as a citizen.
- (2) His problem of choosing what disposition to make of his labor services. This choice may be a recurrent one, and may need to be made in conjunction with the one of optimum utilization of capital, when the individual owns capital funds or goods.
- (3) The production and marketing decisions made after he becomes engaged in farming operations.

The training envisaged in (1) would be useful and suitable for all students at a secondary school level, although in a program of agricultural education, somewhat more attention might be given to his role in the formulation of agricultural policy.

The training for the second activity would also be suitable for all secondary school students, although again it could be slanted in the direction of providing a great deal of information about farming because we can assume that one of the alternatives considered by almost every farm boy is that of becoming a farmer.

The training for (3) would be entirely specialized for agricultural students. Of course, not all the decisions in this category fall in the field of marketing. Most are farm management decisions, but much marketing information is required before rational decisions can be reached. One of the most important functions of formal education in this area is to set forth the sources of the needed information.

Now, let us go back for a few moments and elaborate a little bit on the types of knowledge that would serve the individual in each of the roles we have listed.

As a citizen, it is vital for our individual to understand the functioning of the

economic system. This is important not only for intelligent participation in all kinds of political processes but also in making all the other economic decisions he must make. One of the better discussions of the functions of an economic system is Stigler's, based on some of Knight's material.¹ This aspect of economics, combined with some discussion of the purposes of individual and group economic activity, and of the definition and criteria of economic welfare should be a valuable foundation for the training of any "student"—whatever his age. Its difficulty is granted, but its value should make the investment in ingenuity and effort a good one. It must be stressed that the instructor would need to be adequately grounded in economics; however, one of the themes of this session appears to be that agricultural educators could profit from a basic amount of economic training.

The second type of activity for which our individual needs training is in the selection of the economic activity by means of which he proposes to earn his livelihood. This is particularly critical for those who originate on farms because we are told from all sides that we will need fewer and fewer farmers as time passes. Thus the individual needs to be provided with information on which he can decide how to market the services of his own labor.

The third type of activity is the only one that applies exclusively to individuals who expect to be engaged in agriculture. At this stage the marketing information could usefully be incorporated to complement the production information so vital to farmers. One of the principal contributions that formal education could make in this area would be to acquaint the individual with the sources of information that he might need. This would include, in particular, price information over time on farm products he might possibly produce, and on factors of production he might utilize. This area would encompass all information needed for the farmer to make any necessary marketing decisions. Other useful knowledge to be imparted at this stage would include the marketing agencies and structure for the principal farm products in the particular area.

DISCUSSION: AGRICULTURAL POLICY

G. E. BRANDOW

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Teaching agricultural policy to high school students is no easy matter. Usually only persons having some maturity and experience with economic instability fully appreciate the importance of the subject. Ideally, too, the student of policy should have a good background in economic principles and some sophistication about the political processes through which government operates. The usual high school student has little of this. Yet policy is made, directly or indirectly, by the people at large, and it does not make sense to reserve instruction in policy matters to the few who have an ideal background of experience and education. We do not do this in extension work and we should not do it in the vo-ag program in high schools.

It seems to me practicable to seek four objectives relating to policy in teaching vocational agriculture. We should try to give the student four things:

1. Some appreciation that a farm is part of a complex, highly interrelated

¹ George J. Stigler, *The Theory of Price*, New York, 1949, Chap. 3.

economy; that farm price programs may have important effects on other members of society and on our total economic efficiency; and that in an appraisal of national farm policy these effects properly should be considered along with the immediate consequences for the individual farmer. Here we attempt to create an attitude of responsibility toward the rest of society.

2. An understanding that, in large part, prices reflect economic forces and play an important role in directing adjustments both within and outside of agriculture. The student should understand, for example, that prices are seldom set merely by the caprice of dealers and that almost never can an unsatisfactory price situation be attributed solely to some scapegoat.

3. A non-technical but sufficient understanding of demand and supply analysis to know what the principal sources of variation in farm prices are and to predict the major outcomes of simple but important forms of price manipulation. Farm people usually are poorly informed about the demand side of markets. It should be possible to get across to high school students the idea of a demand schedule, the limitations the schedule puts on what can be done in fixing prices, and the importance of changes in consumers' incomes to farm prices. The student should be able to reason through, for example, the relation of high price supports for a storable product to accumulation of stocks and to restrictions on output, or be able to distinguish between a true storage program and a price raising effort.

4. A knowledge of the main points of currently important price programs, an understanding that these are not settled questions but are much debated and subject to change, and an interest in policy that will lead to continued learning after high school days are over.

It will be observed that these objectives place more emphasis on understanding important economic relations than on knowing the details of present programs. Also, the objectives imply that this most certainly is not to be a program for indoctrinating the student with the teacher's or anyone else's ideas of the shape farm policy should take. And the instruction should show the vital importance of farming to the economy while at the same time correcting any tendency on the student's part toward agricultural fundamentalism.

These objectives can be achieved in two general ways. It seems likely that in large measure the desired attitudes and interests on the student's part can and properly should be developed incidentally to instruction now being given. By enlarging the scope of the discussion a little when appropriate topics are being considered in class and by communicating his own attitude and interest to the student, the teacher can accomplish a great deal in this direction. It will be necessary, however, to devote some class time specifically to economics and policy. By the time a boy is a junior or senior, he should be receptive to a simple, practically-oriented discussion of price determination, designed to achieve objective three above. The main points of current programs also deserve systematic treatment in class; guest speakers and assigned readings in periodicals may stimulate interest and convey considerable information, but they cannot be relied upon to do the whole job.

My impression is that many teachers of vocational agriculture now make an attempt to teach a little policy. They often have someone in from the Grange, PMA, or other organization to talk to their boys. They may assign readings in magazine articles which struck them as interesting, informative, and simple. The vo-ag students in Pennsylvania, at least, take a course in "Problems of Democracy," and farm programs are sometimes discussed there. But my impression is

that the training in policy is pretty hit or miss and better at arousing interest than in giving the student information to improve his ability to think effectively for himself on policy matters. This leads us, then, to some things that need to be done to improve the situation. Three main sorts of action seem to be indicated.

1. The teacher himself needs to be better equipped and more disposed to do the job desired in policy. As Professor Peterson says, the teaching approach in vocational agriculture is one in which all subjects are oriented toward the farm and more or less taught simultaneously. But though the teacher is supposed to drive his horses all abreast, it is a simple matter to let some trail behind if the teacher is so inclined. There is a strong temptation to devote practically all the student's time to production and farm mechanics, where the application of the material taught is obvious and where few if's, and's and but's are involved. The undergraduate curriculum for future teachers needs to include the economics courses required to provide the desired training and interest. At the same time, we must recognize that the vo-ag teacher is expected to know everything about farming and cannot devote a large part of his college course to any one area. We need to consider whether the courses he takes in agricultural economics really deal with important subject matter in a straightforward fashion and are not unnecessarily cluttered up with formal tricks of the economic trade.

2. The present woeful inadequacy of suitable teaching materials relating to policy must be corrected. In most states, teachers who have a keen interest in economics and policy can find very little written material adapted to their teaching needs. Professor Peterson's discussion of this point probably applies with greater force to policy than to any other field.

3. Administration must facilitate the teaching of policy. An agricultural economist who undertook on his own initiative to prepare teaching materials on policy probably would be wasting his time. He would be unlikely to have sufficient knowledge of real teaching situations to do a good job, and he would have no assurance that any systematic effort would be made to use the results of his efforts, however successful they might be. Administrative recognition of the importance of policy and provision for continuous working together of specialists in education and economics are required.

Agricultural policy, however, is a matter of concern for everyone, not just for farm people. What can be taught to city high school students, to whom agriculture is merely one area of many in which decisions are being made? How can we prepare any student, farm or city, to deal with the wide variety of policy decisions that will face him in the future? This opens up a broader problem than can be adequately discussed here. Let me say merely that I favor class study of selected policy issues that has as its enduring product not a mass of detailed information but an attitude on the part of students that reduces the sway of personal prejudice and involves an appreciation of and demand for objectivity in all policy discussions.

It is encouraging to know that in recent years, economics as part of social studies has been receiving more recognition in high school education and that there has been established the Joint Council on Economic Education for the combined study of this sort of problem by educators and economists. At least, the problem is recognized and competent persons are working on it.

REGIONAL RESEARCH IN MARKETING

Chairman: W. C. Crow, Production and Marketing Administration

WHAT HAS REGIONAL RESEARCH CONTRIBUTED TO MARKETING?

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I BELIEVE that someone who is ignorant of a subject and looking at it for the first time can often contribute a fresh and helpful viewpoint, mainly because he is not encumbered by the customary ways of thinking characteristic of specialists in the field. This is not a popular point of view. I was pleased, therefore, to find that it is shared by our president, George Aull, as evidenced by his inviting me to participate in this program. For I have had no direct connection with the regional research program in marketing. My experience with it is wholly vicarious, mostly third or fourth hand.

I will devote my whole time to the subject matter of regional research, limiting myself to furnishing some factual information on this aspect of the program. I shall confine myself, also, to the "9-b-3" program, though, as we all know, it by no means marked the beginning of the regional approach in marketing research. Needless to say, any views I express are wholly personal, and not of the agency in which I work.

Review of Annual Progress Reports

To appraise properly the contribution of regional research to marketing would require assembling and reviewing the numerous publications through which its results have been made available, and preferably also interviewing some of the users of those publications. Unfortunately, I have not been in a position to undertake this. Instead, I have confined myself to reviewing the annual progress reports of the projects, made available to me by Dr. Fromme of the Office of Experiment Stations, Executive Secretary of the Committee of Nine.

I found these reports, on the whole, highly informative. Annual reports all too often give only the most perfunctory indication of the year's work, and under "accomplishments" merely assert that "the results of this work should be of great benefit." Most of the reports of the regional research projects, in contrast, give concrete pictures of the work and its results, and contain many specific examples of actual or anticipated uses of the results.

In reviewing consecutively this set of reports, one is impressed with the

large area of subject matter they cover. As of last January, there had been 35 regional research projects in marketing of which 27 were still active. Almost all of the projects were commodity-oriented, but most of them included research on many functional phases of marketing within their commodity field.

Commodity-wise, there have been projects on dairy products, poultry products, fruits and vegetables, and potatoes in all four regions, and on livestock in all except the Northeast. The South has regional projects on cotton and citrus, and a Western project, now discontinued, dealt with the marketing of desert grapefruit. There has likewise been a Western wool project, and the Northeast is undertaking one on forest products.

The only project clearly on a functional, rather than commodity, basis is the one recently undertaken on trade barriers in the Western region. Quasi-functional projects include the North Central study of locker plants and home freezers, limited, however, to their role in livestock and meat marketing; and new North Central projects on grain storage and on price supports and marketing agreements. The latter again is limited to potatoes, at least initially, and comparable studies in other regions are carried under their potato-marketing projects.

In trying to form some picture of the subject-matter scope of the work, I set up a series of functional headings for classifying the various projects. Diversity of subject-matter within them, however, made this impossible. Even a classification of sub-products did not seem very meaningful. Therefore, I shall merely review briefly the extent to which the over-all projects include work in the several subject-matter fields.

Descriptive Studies

First, a large proportion of the work can be classified under the heading "Basic data and descriptive material on market structure and organization, marketing channels, practices, etc." On fruits and vegetables and poultry products, particularly, a good deal of this descriptive research has been done in all regions. The dairy, livestock, and cotton projects in the South, and the Western livestock project, likewise, report extensive descriptive surveys. I believe that these reflect genuine needs in terms of the present status of our knowledge in these fields.

Right here, I should like to insert a word in defense of the often-reviled descriptive research. I agree in principle that scientific method consists of obtaining data to test previously formulated hypothesis. This is customarily handed out to us in the social sciences as the method through which the natural sciences have achieved their high degree of perfection. But having some background in the natural sciences myself, I am impressed with the great volume of their factual information. The physicist and chemist, the biologist, the engineer, each have whole libraries of reference

volumes full of tables and descriptive data. These handbooks and compendiums continually get fatter and fatter, and I know that the elaboration of this data has not all been undertaken in connection with the testing of specific hypotheses. Natural scientists have found through centuries of experience that certain types of basic data are essential to their daily work, whatever the subject. Great amounts of specialized knowledge are considered necessary in the natural sciences to qualify a researcher to formulate hypotheses that will be worth testing, or to enable him to plan intelligently the specific experiments needed to test them.

I am likewise increasingly impressed with how much there is to know about marketing and how little we actually know in the way of concrete, factual data. In economics as well as in biology or chemistry, there is need for a great deal of work just in finding out what it is with which we are dealing. If a "hypothesis" is needed to justify descriptive research in marketing, it is simply that the categories with which the economist works—supply and demand, volume of movements, prices and price-making mechanisms, fixed and variable costs, marketing channels and practices, market organization and institutions—these and the time and space relationships within which they interact—that such economic categories will be meaningful in dealing with marketing problems.

Incidentally, we researchers in public institutions should not flatter ourselves that we have an exclusive franchise on problem solving. I get the impression that some of the descriptive work that we may look down upon is highly regarded by producer and industry groups, and that they sometimes find it very helpful in working out their own salvation.

Further criticism is made, of course, that our descriptive data in marketing, and in fact through much of economics, is perishable—that we go to great lengths in gathering facts which are already out of date by the time we analyze them and draw conclusions. This is certainly one of our great difficulties, and there is no easy solution. It is particularly true in a dynamic, progressive economy such as ours. The only answer is the scientist's faith—that in economic as well as in other phenomena there is order that research can bring to light, given sufficient factual information and sufficient imagination for discovering orderly relationships within it. Lacking this faith, our alternative is simply to give up our endeavor and turn to other occupations.

One corollary of the transient nature of economic data, however, is the need for time series. Our economic source materials are cluttered with one-time studies that are useless for most purposes because there is nothing with which they can be compared. It is to be hoped, therefore, that the most useful of the descriptive surveys provided in increasing numbers by recent marketing research—including the regional programs—will be re-

peated at appropriate intervals or, better, will lead to development of continuous reporting services furnishing a great deal more data than is now available in the form of time series.

All this is not to say that a hit-or-miss willy-nilly collection of data is useful research. Surveys must be planned to throw light on the relationships in terms of which we can achieve economic understanding of the marketing process. The ultimate test of descriptive studies is whether the data they make available do prove useful in identifying problems and formulating fruitful hypotheses for their solution. How well the descriptive work under the regional projects will meet this test remains in large part for the future to determine. There probably has been a good deal of lost motion. Nevertheless, in many of these programs the work has moved ahead from descriptive phases to phases dealing with specific problems, and I believe that much of the descriptive work of the first phase is providing necessary background for getting into the analytical work of the second stage.

Costs, Margins, and Operational Efficiency

Returning to the subject-matter classification of the regional work, my second heading is "Costs, Margins and Efficiency of Operations." Work in this category has been included in many of the regional research projects. This is true of the fruit and vegetable work in all regions, dairy and poultry work in the Northeast, dairy work in the West, and cotton in the South. The new North Central projects on retailing of meat and grain storage likewise are concerned with this subject. The list is not exclusive since some phases of many other projects certainly impinge upon this field. Some of this work has been largely fact-gathering, but some has involved rather elaborate analysis, such as the development of models as norms of efficient operation of plants.

"Quality" is a third broad subject-matter area dealt with even more widely. Under this heading are studies on measurement of quality and quality maintenance and control, including grading; likewise the many studies on the deterioration of products in marketing channels. Much of this work has been primarily technological, but a number of studies have aimed definitely at quality-price relationships. Work under this heading has been carried on relating to poultry and fruit and vegetable products, including potatoes, in all regions. The Western wool project has been primarily in this field. An outstanding effort at concerted attack upon a complex and difficult quality problem is the widespread work in the North Central region on marketing livestock by carcass grade and weight.

Somewhat related to quality is the work on retail merchandising and studies of consumer preference and acceptance. Studies in this field have been particularly numerous with respect to fruits and vegetables

and potatoes. A good deal of work has likewise been done on poultry products, especially in the Northeast and Western regions. Most of this work has been rather narrowly directed, seeking simple, factual answers to quite specific questions.

Price, Supply, and Demand

A fifth broad category of work deals with price analysis and studies of supply, demand, and consumption. Dairy research has heavily emphasized this subject in all regions. Some aspects of the poultry, livestock, and fruit and vegetable work in the West come under this heading, and I understand that a sub-project is being discussed in the Northeast on regional balance of supply and demand for poultry. Other studies have also been included in the Southern projects on livestock, citrus, and cotton. A North Central study has included competition between local and Northwest apples in Midwestern markets, the Northeast has studied production trends in potatoes. Particular interest in this kind of work in the West arises from the rapid growth of population there and the shifting marketing patterns to which it has given rise. Interest in the South arises from new developments in citrus processing and from the need to develop an efficient marketing system for the growing livestock industry.

Studies of potato price-support and marketing-agreement programs under way in the North Central region and being undertaken in the South necessarily involve price, supply, and demand analysis. I have classified them, however, under another heading, "Studies of Government Programs." Other items under this heading include the studies of state milk control laws in the Northeast and North Central regions, the cotton one-variety and bale-identification programs in the South, the public regulation of grain warehouses in the North Central, and trade barriers in the Western region. It is heartening to note the increasing interest in program appraisal. This is an area in which a regional approach offers possibilities of making a unique contribution.

Developmental Research

One additional heading which I personally consider of great interest is what I would call "Developmental Research," dealing with new products or new marketing methods and practices. I have already mentioned the North Central project on marketing livestock by carcass grade and weight. Many of the technological studies relating to quality have developmental aspects—the marketing of peeled potatoes, for example; the development of new treatments for preserving quality in eggs or fruit and vegetable products; the design of improved shipping containers or new handling equipment and methods. A number of projects have included studies of consumer packaging. A good many of the consumer preference

and acceptance studies on various commodities have involved tests of new marketing services. Most of the developmental studies so far seem rather scattered and isolated, although collectively they add up to a good deal of work, with many results capable of rapid application. It is to be hoped that as time goes on there will be an increasing number of concentrated efforts designed to test and demonstrate commercial practicability of substantial marketing improvements.

This completes a rather sketchy review of subject-matter fields dealt with in the several regional research projects. Collectively, they represent a large volume of effort. One indication is the number of manuscripts that have come out of the work. On the basis of publications listed in the progress reports, I was able to identify around 100 printed bulletins; 60 or 70 mimeographed reports and leaflets; and perhaps 100 articles in professional and trade journals. This leaves out 60 or 70 publications for which the citations were not specific enough to permit classification. Another 70 or 75 manuscripts were prepared or in preparation at the end of calendar year 1951. Specific mention was made of over 20 master's theses or doctoral dissertations, and I have no doubt that there were a great many more that were not cited as such. Altogether, some 400-odd reports are listed. You can see now why I was hesitant to undertake a comprehensive review of all of them, but preferred to content myself with reviewing the annual progress reports on the work that lay behind them.

Reference to these brings to mind the important contribution of this program in the training of research workers. Here, again, the descriptive as well as the more advanced analytical phases of the work provide favorable opportunities. I have heard it said that Alfred Marshall was able, merely walking through a plant, to point out to the proprietor numerous respects in which he could improve the economy of his operations. But I do not believe that Marshall could do that when he was a graduate student.

Descriptive studies can help younger researchers get their feet on the ground, familiarize them with the particular industry they are studying, build contacts with producers and tradesmen, and qualify them to interpret problems in terms capable of economic analysis. This sort of training is not a unique contribution of the regional program, although the program has broadened the opportunities for it. Furthermore, the possibilities for leadership contacts outside the student's own institution should be of great benefit. Indeed, I have heard many older workers remark on the benefits they have derived from discussions of problems and methods with workers from other institutions, in contacts afforded them through the regional research program.

Coordinative Influence

Referring again to the volume of publications listed in the reports, not all of them resulted solely from the "9-b-3" projects. Related state or federal publications "of regional significance" were included in many lists, even though the regional technical committee had had no more than a coordinative relationship to them. This points, however, to perhaps the most important contribution of the regional research program—that of bringing representatives of different research agencies together for joint discussion of problems needing investigation and for planning a coordinated, forward program and a desirable division of labor in carrying it out. Titles of individual state projects and of the reports on these projects are for the most part subjects upon which individual states commonly undertake work on their own. If one were to inquire what is distinctively "regional" about the projects carried on under this program, I believe that he would find the answer in terms of cooperative planning rather than in terms of distinctive subject-matter.

Perhaps we need less emphasis upon *projects* and more upon *programs* in regional research. The important thing is that workers from a group of states having common marketing problems get together to appraise those problems and plan a concerted attack upon them. They do not need all to do the same thing. Economists should be peculiarly aware of the advantages of specialization and division of labor. But they do need to develop a joint plan of action through which the results of their several endeavors will add up, over a period of time, to solutions of significant problems of producers and the trade in their areas. This is the essence, and the test, of the cooperative regional approach.

And here, I should like to mention one administrative inflexibility that may be hindering a full flowering of cooperative endeavor. I refer to our regional boundary lines. Marketing problems are no respectors of these lines. This is recognized in a number of instances—participation of Kentucky in the North Central dairy and livestock projects, for example. But I can conceive that states on the West and East coasts may have common research interests in the marketing of western fruits and vegetables in eastern consuming areas. And I can conceive that for many problems sub-regions, some of them crossing regional boundaries, may need to be recognized as separate units for the conduct of cooperative regional research.

Developing Cooperation

But the wonder is not that our marketing research failed to be transformed overnight through the regional research program. Rather, it is that as much coordination and cooperation have been achieved as seemed to

me evident in many of the progress reports. I once sat in a meeting at which Dr. Cardon, then administrator of Agricultural Research Administration, discussed with the Experiment Station Marketing Research Advisory Committee problems in connection with the Agricultural Marketing Act. He dwelt at considerable length upon the great patience and the painstaking effort that is required for the development of effective cooperation in any field of research.

At the start of the regional research program, most of our workers had limited experience in the joint planning of programs on a region-wide basis. We had individuals and we had schools that had developed particular lines of work on their own and had achieved outstanding reputations in the process. It was hardly to be expected that they would easily be diverted by a new administrative arrangement or would feel the need for advice from their neighbors on what needed to be done. They were more ready to add to their following than themselves to work in harness as part of a team.

This is reflected in variability in pattern among the regional research projects. I found at one extreme highly coordinated studies in which each state carried out surveys using region-wide, uniform questionnaires. I found at the other extreme projects with a minimum of coordination, based apparently upon a sort of live-and-let-live agreement to avoid actual duplication of work, but with each state undertaking whatever studies its workers had a particular interest in. Between these extremes I found all different degrees of coordination, reflecting, obviously, the extent to which the participating agencies and individuals were able to agree upon problems needing work and upon cooperative approaches to them.

One gets the over-all impression from the progress reports of initial confusion with a number of false starts and a good deal of waste motion. This initial confusion appears generally to have been overcome, in one fashion or another. The resulting pattern varies from project to project. But in most cases, constructive planning seems to have emerged in which an increasing degree of bonafide cooperation is evident. Further experiments continue to be made with regard to the organization of this cooperation and this is as it should be. I trust that the remainder of this session will shed additional light on that topic.

The Test of the Future

From the subject-matter standpoint, the annual progress reports of the regional research projects in marketing impress me with the wide scope of the work. There have been many individual, concrete achievements towards solving specific problems. Probably the greatest contribution so

far, however, has been the substantial addition that it has made to our marketing information.

The test of the future will be the extent to which this information-gathering helps us devise solutions to marketing problems; solutions that can be put into practice by producers, marketing agencies, and consumers and that can make real improvements in our marketing system. This, in turn, will depend in large part on the success with which we further develop the method of regional cooperation in identifying the significant problems and organizing concerted attacks upon them.

METHODS AND PROCEDURES IN PLANNING REGIONAL MARKETING RESEARCH¹

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FOLLOWING passage of the Research and Marketing Act in 1946, expenditures of federal funds by state agricultural experiment stations for regional agricultural research grew each year until, in 1951, they exceeded five million dollars. Total cost since 1946 is 14 million dollars. About 30 per cent of this sum was spent on regional marketing research. More than 1,200 regional research publications have been prepared, of which 40 per cent pertain to marketing.³

Regional marketing research has made substantial progress. The purpose of this paper is to examine the methods and procedures that have been developed over the past six years in an attempt to determine, in the light of experience, the directions in which further progress might be made.⁴

¹ Journal Paper No. J-2156 of the Iowa Agricultural Experiment Station, Project No. 1013. A more extended version of this paper is given in the Report of the National Marketing Workshop, 1952, ARA, USDA.

² The authors wish to acknowledge helpful suggestions and criticisms by W. G. Murray, Frank Robotka, Don Kaldor, E. O. Heady, J. Timmons, R. Olson, Henry Homme, Dick Phillips and others of the Economics and Sociology Department at Iowa State College, and of Harry Trelogan, Fred Waugh, and W. C. Crow of the USDA.

³ The data, provided by F. D. Fromme, Research Coordinator, Office of Experiment Stations, USDA, are given in greater detail below:

Expenditures by the State Agricultural Experiment Stations
for Cooperative Regional Projects
Established under Section 9b3, Research and Marketing Act

Year	Section 9b3 Funds	Other Federal- Grant Funds	Non-Federal Funds	Total
1948	\$ 422,156.60	\$ 433,252.09	\$ 493,888.08	\$ 1,349,296.77
1949	822,800.86	1,004,033.42	1,289,136.05	3,115,970.33
1950	1,161,627.81	1,418,995.46	1,782,058.00	4,362,681.27
1951	1,292,250.05	1,699,757.56	2,195,861.00	5,187,968.61
	\$3,698,935.32	\$4,556,038.53	\$5,760,943.13	\$14,015,916.98

⁴ The paper is focused upon regional research in the field of agricultural marketing, because regional research is new and still in a state of flux and because the authors' direct experience is limited to agricultural marketing. But the discussion of fundamental research method presented in the first third of the paper applies to individual as well as regional research and to production as well as marketing.

Kinds of Research

First let us look at the results of this regional marketing research.

Research work can be classified into a few broad categories. Two categories that are generally used are descriptive research, and analytical research. Descriptive research seeks out and assembles raw factual data—e.g., shipments of eggs, by states and by years, etc. It shows what the raw facts are.⁵ Analytical research is quite different. It reveals cause-and-effect or other relationships underlying the raw facts. It explains the raw facts.⁶

The terms “descriptive” and “analytical” are not very accurate. Both kinds of research are descriptive. The one describes facts, and the other describes relations. Furthermore, what is called analytical research does not really analyze (separate into component parts); rather, it reveals relations. The so-called descriptive research, which usually encompasses a wide field of diffuse data, can more accurately be called *panoramic* research. And the so-called analytical research can more accurately be called relational or *explanatory* research.

A third category of research can be added to these two. This category can be called inventive or *problem-solving* research. The objective of this kind of research is not merely to describe raw facts, nor to explain them, but to solve a marketing problem. This requires inventing new ways of doing things.

Most regional marketing research conducted over the past five years falls into the first category—descriptive panoramic research. There are good reasons for this. One reason is that many state research men are uncertain how to proceed with regional research, and are inclined to want to take stock of the marketing situation in the region as a whole before they proceed. Another reason is that there is a strong tendency for each regional committee to allocate its funds more or less evenly among the states in the region. This reduces each state's allocation to something like one or two thousand dollars. This is not enough to accomplish much in any one state, but it is enough to start financing of one state's participation in a regional general data-gathering project, and it does tend to divide up the work approximately equally, in proportion to the division of the funds. In addition, this kind of project is clearly (at least in a geographical sense) a regional project, since it covers the region. And once a project of this sort has begun to be considered, there is a strong incentive for each state to participate, even against its better judgment, so as not to mar the project by abstaining and creating a gap in the regional coverage.

But the results of this regional panoramic research have fallen short

⁵ See for example *Grain Production and Marketing*, USDA Misc. Public. No. 692, October, 1949.

⁶ See the regression analyses in Glenn L. Johnson's *Burley Tobacco Control Programs*, Kentucky Agr. Exp. Station, Lexington, Kentucky, Bulletin 580, February, 1952.

of expectations. It is difficult to enforce uniform procedures for all states in the region, and in some cases the data from the different states have not been comparable when they have been brought together for the region as a whole. In addition, problems may change over the two or three year period usually required to complete a regional survey and get it into print. In many cases, results of the studies have been used little by research workers, producers, consumers, or distributors.

It seems clear that panoramic survey-type research is not adapted to regional committee attack. It is conducted best by a vertically integrated, centralized organization, such as the federal Bureau of the Census or the BAE, with a small general staff of statisticians at headquarters to determine objectives and efficient procedures, and an army of subordinates instructed to carry them out.

Scientific Method in Regional Research

When the regional organization exerts an unintended pressure in the direction of descriptive panoramic research projects, it reverses scientific research procedure. Scientific research procedure does not start with a situation and end up with a broad panorama. Nor does it start with a panorama and end up with a problem. It starts with a problem and ends up with a solution.

Essentials of scientific research procedure may be outlined briefly by quotations from several authorities on scientific method.

1. The first step in research is not to "go out and get the facts." Cohen and Nagel make this point clear.⁷

Has the reader ever been guilty of believing or saying that the way to find out the truth is, to "study the facts" or to "let the facts speak for themselves"?

... It is an utterly superficial view . . . that the truth is to be found by "studying the facts." It is superficial because no inquiry can even get under way until and unless some *difficulty is felt* in a practical or theoretical situation. It is the difficulty, or problem, which guides our search for some *order among the facts*, in terms of which the difficulty is to be removed. . . .

The first step in research rather is to define a specific problem in the field to be investigated.

Without a problem, there is blind groping in the dark. The way in which the problem is conceived decides what specific suggestions are entertained and which are dismissed; what data are selected and which rejected; it is the criterion for relevancy and irrelevancy of hypotheses and conceptual structures.⁸

⁷ Morris R. Cohen and Ernest Nagel, *An Introduction to Logic and Scientific Method*, Harcourt Brace, 1936, p. 199.

⁸ John Dewey, *Logic, The Theory of Inquiry*, Henry Holt and Company, New York, August 1949, pp. 107, 108.

The problem approach is based upon the fundamental objective of research. Surely the fundamental objective is to find the best way⁹ to do things. The most efficient procedure to attain this objective is not simply to gather facts, hoping that they can be analyzed (explained). Nor is it to make analyses, hoping that they can be used to solve problems. A large percentage of the research done on this hit-or-miss basis would not be useful. Scientific method requires that the investigator start with a problem. With the problem clearly defined, the investigator is then in a position to draw upon or perform any explanatory work that the problem shows is required before he proceeds to the second step, the formulation of hypotheses.

2. The second step in research procedure is the formulation of hypotheses, or, in more everyday language, the setting up of one or more tentative explanations or solutions of the problem. This is the flash of insight, the "leap in the dark" beyond existing concepts and knowledge—the brilliant guess, the original spark. It is the essential step that distinguishes explanatory and problem-solving research from purely descriptive panoramic research. "The essential feature of the scientific method is the examination of what is already known and the formulation therefrom of hypotheses which may be put to experimental test."¹⁰

The investigator does not "go out and get the data," analyze them, and apply his findings to a problem. He goes at it the other way around. He defines a problem, sets up a hypothesis, determines what data will confirm or refute the hypothesis, decides on the most efficient way to get the data, and then is ready to go out and get them.

We cannot take a single step forward in any inquiry unless we begin with a *suggested* explanation or solution of the difficulty which originated it. Such tentative explanations are suggested to us by something in the subject matter and by our previous knowledge. When they are formulated as propositions, they are called hypotheses.

The function of a hypothesis is to *direct* our search for the order among facts. The suggestions formulated in the hypothesis *may* be solutions to the problem. Whether they are, is the task of the inquiry. . . .¹¹

The essential place that a hypothesis holds in scientific method may be summarized in these words: You have to have it in your head before you can do it in the lab. In more general terms, you have to have a definite (even though tentative) solution in mind before you can go out and test it.

3. The third step is planning how to test the hypothesis.

The hypothesis determines what data are needed, how they will be col-

⁹ "Best way" in this context means the way that will most fully satisfy consumer wants and promote the general welfare.

¹⁰ O. Kempthorne, *The Design and Analysis of Experiments*, Wiley, 1952, p. 1.

¹¹ Cohen and Nagel, *op. cit.*, pp. 200-201.

lected, and how they will be analyzed. On the basis of the hypothesis, the testing procedure needs to be worked out with the help of the best statistical advice available. This is the time to bring the statistician into the project planning—before you have decided what data you need, and how you will collect them and analyze them, not after you have collected them.

4. The fourth step is the actual collection and analysis of the data.

5. The final step is the statement of the conclusions, the staking out of the new territory to be added to the field of knowledge. The conclusions are the end and object of the project and the focus of attention from the first.

There is an uneasy feeling in some quarters that problem-solving research calls for “quickie,” “applied” projects. The above outline of the five steps involved shows that this feeling is unjustified. Problem-solving usually requires fundamental research that penetrates below the surface. Considerable time usually is required to delineate the problem, draw upon or perform any necessary explanatory research, develop the hypothesis, and collect and analyze the data that will test the hypothesis.

Hypotheses for Regional Research Problems

Several suggestions for bringing regional marketing research to the highest possible level of achievement are offered below, in the form of hypotheses to be tested.

The over-all problem is how to shift the emphasis in regional marketing research from panoramic research to explanatory and problem-solving research.

The solution of this problem in itself constitutes an exercise in good research method. Several tentative recommendations or solutions may now be advanced as hypotheses to be tested and confirmed or refuted.

1. Committees: Boards of directors, not research-conducting units.

The first hypothesis is that the flexibility and incisiveness of individual initiative can best be combined with the advantages of joint committee action if the regional research committee functions as a sort of board of directors, rather than as a research-conducting unit.

On this basis, research projects would be initiated and developed by independent individual action, with or without previous suggestions from the committee, and then presented to the committee for appraisal, possible revision, and financing by an allocation of committee funds.

This would call for a good deal of individual work to be done before the committee meets. Research projects would be initially outlined by individual research men acting independently in the different states in the course of their regular work. The projects would then be brought before

the full committee at the next meeting, all set up on paper and ready to go, as the basis for appraisal and as a request for committee funds.

The full committee would consider the various projects, and authorize and allocate its funds to the few that it could finance. Those projects which the committee could not finance could be conducted on a smaller scale by the originating state or states, or tabled for action later.

It seems likely that if the committee wished to do so, it could finance lone-wolf, single-state projects, as well as projects that included participation by two or more states and thus obviously qualified as regional projects. A single-state project, endorsed by the full committee, would meet the spirit of the law. Whether it would also meet the letter of the law is a question that may need to be answered by an administrative ruling.¹²

In selection of projects and allocation of funds by the committee, no attempt would be made to spread the funds at all evenly over the states in the region. The bulk of the funds would be allocated to a few projects at a few stations. These stations, being more adequately financed than if the funds were spread evenly over all the states, would be able to give substantial attention to the projects and do a bang-up job. They would carry through the actual collection and analysis of the data, and eventually report their findings back to the whole committee for review and appraisal.¹³

Thus, the whole committee would select and finance the problems, but the whole committee would not conduct the research. Only a few stations would conduct each project. This would not need to mean that the rest of the states who received no allocation of regional funds from this committee would object, or feel left out; they would probably be receiving an allocation of funds for a different project from one or another (or more than one) of the other regional committees.

2. Allocation of funds within the region as a whole.

The second hypothesis is that the allocation of funds within the region as a whole could be performed by a group that represented regional research in the region as a whole, not separately by each commodity or functional committee in the region as at present. This group could consist of the chairman of the different commodity and functional regional re-

¹² This procedure, incidentally, would provide a basis for defining a regional project, not as a project in which two or more states in a region are jointly conducting research, but as a project that the regional committee is sufficiently interested in to finance, whether the project be conducted by more than one state or not. This matter of definition of a regional project needs more extended treatment than it can be given here.

¹³ This procedure was adopted by the North Central Regional Potato Marketing Research Committee when it concentrated the research work on Project NCM-8 at Minnesota.

search committees in that region, or it could consist of the experiment station directors.

This arrangement would reduce the natural desire of each state to share in regional projects rather than not share in regional funds. Any one state would not feel that it had to have a proportionate share of the funds for livestock research, and for grain research, and for each of the other projects separately. It could ask for none in grain, because it would be getting perhaps half of the total funds allocated to the region for dairy research—enough to do a really creditable job.

This solution has been put to experimental test by the Western Agricultural Economic Research Council, established at Davis, California, in 1948. This council is an excellent example of over-all regional supervision and coordination. Membership of the council is drawn from the departments of agricultural economics of the land-grant colleges of the Western states. The council meets twice a year at different points in the Western region.

Only representatives of the member agencies, typically department heads, vote at the sessions of the Council. However, there are State and Federal agencies and private organizations designated as cooperators by the members of the Council, and such cooperators are welcome to attend meetings and participate in discussions. The Council is financed by contributions from the State Experiment Stations.

So far the Council has been primarily concerned with regional marketing projects instituted since RMA but is broadening its activities and interests to include a wide range of research activities relating to the agriculture of the region including production economics generally, and particularly the variety of problems arising as a result of the Central Valley and Columbia Basin developments.

With respect to the regional marketing projects of the Council, the various technical committees typically hold their meetings for project planning and suggested allocation of 9b-3 funds between the States prior to the session of the Council. Projects developed and recommended allocations of funds are then made to the Council. The Council reviews the proposals in the line of the needs and resources of the region and the institutions concerned and, on occasions, changes substantially the work programs and fund allocations. Results of the Council deliberations are sent to the regional directors who make the final approval of projects and fund allocations.¹⁴

The allocation problem could be handled in an entirely different way. It could be solved before it arose, by the allocation of funds for regional marketing research to individual states in advance, in a lump sum, by formula. Each state would feel quite free to abstain from this or that regional marketing project, knowing that this abstention would not reduce its predetermined allocation. It would then be free to concentrate all its funds on the one or two regional marketing projects that it was most interested in and could handle best.

¹⁴ Letter from Bennett S. White, Jr., BAE, USDA, May 29, 1952.

This arrangement would have the advantage of simplicity and definiteness, but the disadvantage of rigidity. The other solution—allocation of funds by a group that represented regional research in the region as a whole—would seem preferable. It would permit judgment to be exercised by a group that would be in the best position to exercise it.

3. *Regional supervision.*

A supervisory group could be set up in each region to appraise each new project developed in that region, but stop short of allocating funds.

A three-man committee of this kind was set up in the North Central Region in 1951. Its functions appear to be primarily concerned with organization and finance, although its field could be broadened to include such subjects as research method, problems, hypotheses and procedure. Or, a separate committee of technical experts could be set up to advise administrators on projects submitted for regional work.

A technical committee of this sort should not be empowered to turn down projects that it considered unsuitable, but empowered only to offer advice concerning improvements in objectives, procedures, etc. Anything smacking of dictatorial powers exercised by a small committee drawn from a few states over the activities of other states should be avoided.

Perhaps the committee should not be a small committee at all, but should include direct representation from every state in the region. The New England Research Council on Marketing and Food Supply is a good example of broad representation on such a committee.

The purpose of the Council as stated in the original constitution was "to stimulate and coordinate the studies of economic problems connected with the supply of foods and other agricultural products of New England."

The present membership of the Council includes the Agricultural Experiment Stations and the State Departments of Agriculture of New England and Harvard University. The Steering Committee of the Council is restricted to the heads of the Departments of Agricultural Economics of the New England Agricultural Experiment Stations and to a representative from Harvard University.

Both as to purpose and organizational setup, the New England Research Council is a less formal and looser organization than the Western Agricultural Economics Research Council. The Western Council performs the function of allocating 9b3 funds among the states for regional projects—a function that the Steering Committee of the New England Research Council has never taken upon itself.¹⁵

4. *The coordinator.*

The hypothesis here concerns the role of the regional coordinator.

In a number of cases, a regional committee has employed a coordinator

¹⁵ Letter from William Bredo, BAE, USDA, July 1, 1952. For further details, see the February, 1952, issue of the New England Research News.

to facilitate the execution of projects. When the entire committee, or most of it, conducts a research project, a coordinator is virtually a necessity. This coordinator usually is a joint employee of the committee and the BAE, or he may be a full-time BAE man.

Both the role and tenure of the coordinator have been thorny problems, and the solution of either has tended to accentuate the other. If the coordinator is employed jointly by the committee and the BAE, and stationed at one of the colleges, his tenure situation is mixed. In many cases, partly because of this tenure situation, he changes after a few years to full time BAE employment, and moves to Washington. Usually he takes his coordinator job with him. This leads to the coordination of regional research from Washington, in spite of the best intentions to the contrary on all sides. This sort of coordination was not the intent of the RMA of 1946, nor is it desired by most state college and federal workers.

If the regional committee became more of a board of directors and less of a research-conducting agency, there would be no need for a coordinator to facilitate the committee research. The committee would not be conducting research. Rather, it would be coordinating the several regional research projects being conducted and coordinated by other responsible persons or groups.

Rainer Schickele suggests that each project be conducted by "a mature and highly qualified full-time researcher in full charge of the project, stationed at one of the colleges as a full-fledged staff member." He then proceeds to consider the problems of tenure that would be involved. These problems would be difficult, for a mature and highly qualified worker would not be much attracted by a project that would last only a few years, as most projects necessarily do. At best, he would face moving to another project at another station every few years; at the worst, he would have to look for another job.

We suggest rather that the project leader in each case be one of the regular college staff. The project would not distract the leader from his regular work; it would be an extension of his regular work. No coordinator in the usual sense would be needed to coordinate the committee research. There would be no committee research per se; there would simply be several research projects authorized and financed by the committee. Each project would be in charge of one or a few stations coordinated internally (within each project) by that station or those stations; intercoordination (among those projects) would be effected by the committee.

5. Need for interdisciplinary cooperation within committees.

The fifth hypothesis is that regional research would benefit from more inter-disciplinary cooperation within each committee.

At present, most regional research committees in the North Central region are composed almost entirely of workers from only one discipline in each case. The North Central Regional Dairy Marketing Research Committee consists entirely of agricultural economists. The North Central Livestock Marketing Research Committee used to include one animal husbandry man, but he has recently been replaced by an agricultural economist, so the committee now consists entirely of agricultural economists. The grain marketing committee contains only agricultural economists. The potato committee includes two technologists; the rest are agricultural economists. The fruit and vegetable committee has a broader distribution; it consists of four agricultural economists, four horticulturists, one food technologist and one home economist. The poultry group is split right down the middle into two separate committees—one composed almost entirely of agricultural economists, and the other composed almost entirely of poultry husbandry men.

This separation among disciplines has arisen from natural causes. It is difficult enough to get sufficient agreement on problems and procedures to permit a committee to move along, when the members of the committee are all drawn from one discipline. It is still more difficult to make progress when the members are drawn from two or more disciplines.

But this passes up one of the great opportunities provided by regional research—the opportunity to benefit from inter-disciplinary cooperation and draw on an entire region for those who are able to contribute to the delineation and solution of particular problems, whatever their fields of specialization may be.

The dairy committee, for example, could well include members not only from the field of agricultural economists as at present, but also technologists. And since technology is a broad term, the committee could include men from several technological fields. For example, it could include a milk sanitarian, specialists in fluid milk and dairy manufacturing plant operations, and a home economist or nutritionist. The livestock committee could include meats and other technologists. A statistician should be included on all committees.

Composition of the committees should be variable as well as diverse. Membership should be changed, a few members at a time, as old projects are completed and new ones are initiated to take their place. Some continuity of membership is desirable, but the composition of the committee should be flexible enough to permit new members to replace old members as new projects replace old projects.

6. The regional project outline form.

The sixth hypothesis is that some changes in the present regional

project outline form in common use would help to remind research workers of the principles of good research method as they develop their projects.

The project outline form that is in common use at present is set up as follows:

- | | |
|-------------------------------------|----------------------------|
| I. Date | VII. Regional organization |
| II. Title | VIII. Procedure |
| III. Objectives | IX. Duration |
| IV. Justification | X. Approval |
| V. Previous work and present status | XI. Budget |
| VI. Cooperating agencies | |

The form that we would like to recommend for consideration is shown below, together with some explanatory comments:

- I. Date (same as at present)
- II. Title (same as at present)
- III. Problem (this should be a clearly defined and specific problem, not a general discussion of the problem area.)
- IV. Previous work and present status (same as V at present)
- V. Hypothesis or tentative solution to be tested (preferably, this should be a single specific hypothesis, just as the problem outlined under No. III should be a single problem.)
- VI. Data required to test and confirm or refute the hypothesis.
- VII. Method of collecting data (size and kind of sample or controlled experiment, etc.). The method should be precisely related to the hypothesis.
- VIII. Method of analyzing the data, in terms of precise tools, again as related to the hypothesis.

The rest of the outline would be the same as VI to XI in the present form, except that No. VIII, Procedure, would be dropped out, having been replaced by the new VII and VIII.

This form, serving as a summary of the specific steps involved in good research method, would facilitate selecting the problem and designing the project to solve it.

Over-all Conclusion

The general principle of regional research appears sound. Regional research breaches the barriers to interstate travel that previously existed. This promotes exchange of ideas and sharpening of tools that results when workers from different colleges and different disciplines get together, and facilitates the rapid adoption of good methods and discarding of poor ones. It provides a means for avoiding useless duplication of work on a non-comparable basis that can result when research men in different colleges work independently. When so many of our marketing problems transcend the borders of any one state, it seems clear that regional research is the natural and appropriate means for dealing with them.

The suggestions outlined here for changes in regional research methods and procedures are offered as hypotheses for testing. Preliminary testing can be conducted in the laboratory—in the present meeting, in papers in

This Journal and so forth. Any of the hypotheses that survive as worthy of further testing can then be subjected to the acid test of actual practice.

DISCUSSION

J. WAYNE REITZ
University of Florida

Professor Shepherd has favored us with a clear statement of problems involved in regional research and with suggestions for overcoming these problems. His paper is most timely, because I doubt if any single facet of agricultural research has been the subject of more discussion, controversy, and criticism than has regional research over the past several years. This is understandable because this program represents a radical departure from customary procedures. While concerted action in working on regional problems was not entirely new at the time of passing the Research and Marketing Act of 1946, the idea of a national program in which the various states and federal agencies worked together on mutual problems is, in fact, still a novelty to which many research workers and administrators have not become accustomed.

The issues to be resolved are not on the merits of regional research. There is wide agreement concerning advantages to be gained, including (1) the pooling of research talents, (2) stimulation of workers to sharpen their methods of research, (3) ability to work on broader problems of common interest than any one state is capable of handling with the funds at its disposal, and (4) application of results are more quickly spread over a wider area. Rather, the problems are primarily those of changing the emphasis on types of research and of improving operational or administrative procedures.

Since I am in fairly substantial agreement with Professor Shepherd, my remarks for the most part will be supplementary or by way of emphasis.

I am intrigued with his classification of kinds of research into three categories; descriptive research gives way to panoramic and analytical to explanatory. While these suggested terms may represent refinement, one might suspect that they are a play on words as some of our other more recent nomenclature has become. The addition of a third category, namely, "inventive" or "problem solving," is a helpful one, especially since it is the kind of research which should receive increased attention.

While I agree on the desirability of a "problem solving" approach to more of our research problems, it does not follow that we are in a position to go all out on such an approach. This, in the main, stems from the fact that this type of research demands highly skilled and experienced workers, now in short supply. Problem solving requires a rather panoramic view of the workings of the industry concerned. Keen insight is required, which comes only with familiarity and experience with the problem to be solved. Most marketing research must be with some phase of an industry and this calls for cooperation with people of industry. In the majority of instances, to work with industrial people and to get them to accept and appreciate one's views and objectives requires skill and diplomacy. The worker must know the industry, its particular language, and something of the attitudes of the people engaged in the area in which the problem lies. Thus, I am sure that we shall look forward, not only to doing some panoramic and explanatory research because it will continue to be needed, but because a certain amount will be necessary in developing and training men for performing "problem solving" tasks.

In his discussion of tentative solutions for regional marketing research

problems, Professor Shepherd states that, "the over-all problem is how to shift the emphasis in regional marketing research from panoramic research to explanatory or problem solving research." He then proceeds to make some excellent suggestions. His suggestions are pertinent, even though the shift in emphasis which he seeks may not be fully accomplished. That is to say, much of the frustration and discontent over regional research of the type now being conducted could be allayed by adopting better administrative procedures.

For any research program to bear real fruit, cultivating the imagination and initiative of the individual research worker must remain uppermost in the minds of those responsible for developing procedures and administrative arrangements. Under regional research this principle has all too often been ignored because of the tendency of each state in the region seeking what it feels to be its just share of funds for a given regional project. The result is that not infrequently some staff member who has little or no interest in a particular problem finds himself saddled with a dull job to be done. I realize that in land-grant institutions workers cannot escape working on problems which may not be of the greatest challenge to them at the moment, and for that very reason we should not let regional research aggravate the problem. It seems to me that the solutions suggested by Professor Shepherd would go a long way in minimizing this difficulty.

Since this problem is so closely related to the manner in which funds are allocated, it is suggested that, "it could be solved before it arose, by allocation of funds for regional marketing research to individual states in advance, in a lump sum, by formula . . . each state . . . would then be free to concentrate all its funds on the one or two regional projects that it was most interested in and could handle best."

After making this worthy suggestion Professor Shepherd quickly discards it because of its rigidity. He reverts to the allocation of funds "by a group that represented regional research in the region as a whole." I would prefer the suggestion of allocation by formula, and then let a group representing regional research as a whole pass judgment on projects submitted as to whether they merit support from regional research funds.

Finally, I concur fully that we do not need a regional coordinator if the regional committee acts as a board of directors rather than a research conducting agency. We do need, as Professor Shepherd suggests, a leader for each research project involving two or more states. This leader should be a member of a regular college staff and should be vested with enough authority to expedite the work and to see that funds once allocated by various states for that project be spent accordingly.

Regional research has not been all that its sponsors had hoped for. Its possibilities are as great as they have ever been. Instead of taking a dim view of where we have been or are going, I suggest we grow up and make it work by developing better procedures and creating environments more satisfactory to researchers.

INTERREGIONAL COMPETITION IN LIVESTOCK

Chairman: A. L. Larson, Oklahoma A & M College

INTERREGIONAL COMPETITION IN BEEF CATTLE

JOHN G. McNEELY
Texas A. and M. College

THE beef supply of the United States is produced largely at a considerable distance from the major population centers which are the chief consuming areas. Beef production in different regions depends on such factors as feed supplies, alternative livestock enterprises, market outlets and climate. Competition between regions occurs when two or more producing areas have salable surpluses of beef competing for the same market.

The extent of this competition is known to the major packers but has not been measured by the U. S. Department of Agriculture. Available statistics are quite complete in showing regions of beef production. They are deficient, however, in showing meat movements or localized meat consumption. The data given here are only indicative of the production, distribution, and consumption of beef. They are too incomplete and cover too short a period to provide anything more than a basis for discussion.

Texas Is Largest Producer

Production of cattle and calves in 1951 expressed in live weights ranged from four million pounds in Rhode Island to 2,153 million pounds in Texas.¹ The Texas total exceeded the combined production of the 18 lowest ranking states. The top 10 states included Texas and Oklahoma from the Southwest, Iowa, Nebraska, Kansas, Illinois, Missouri, Minnesota, and Wisconsin of the Middle West, and California from the Far West.

Comparison of beef cattle production by states is complicated by differences in quality. Texas beef is largely grass fed while Iowa beef is corn fed and Wisconsin beef is predominately of dairy cattle origin. Under normal circumstances, a large proportion of the beef carcasses are not federally graded and statistics are not available showing grade differences by state or region. Regulations of the Office of Price Stabilization require federal grading and the filing of reports showing slaughter by grade. Summaries from these reports indicate the concentration of slaughter by regions and the distribution of slaughter by grade (Table 1).

Region 7 (Illinois, Indiana, and Wisconsin) and Region 9 (Iowa, Kansas, Missouri, and Nebraska) slaughter over 45 per cent of all the Prime,

¹ *Livestock and Meat Situation*, U.S.D.A., March-April, 1952, p. 20.

Choice, and Good grades of beef. These two regions lead also in the slaughter of Commercial and Utility grades and of bulls. Region 10 (Arkansas, Louisiana, Oklahoma, and Texas) leads in slaughter of the Canner and Cutter grade of beef. About 56 per cent of all slaughter takes place in Regions 7, 9, and 12 (Arizona, California, and Nevada).

TABLE 1. DISTRIBUTION OF SLAUGHTER OF CHILLED CARCASS BEEF BY REGIONS WITHIN GRADES AS REPORTED BY CLASS 1 AND 1A SLAUGHTERS TO O.P.S.—JUNE–NOVEMBER, 1951^a

Region ^b	Prime	Choice	Good	Commercial	Utility	C & C	Bulls	Totals
	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent
1	1.2	.8	.8	1.2	1.4	2.6	1.8	1.3
2	24.7	5.3	3.4	2.2	1.7	2.3	5.5	6.1
3	4.3	2.7	2.8	3.0	2.8	4.0	2.0	3.1
4	.7	1.3	2.4	1.9	1.2	1.7	2.2	1.5
5	.4	1.4	3.9	5.4	5.3	7.9	9.6	4.0
6	6.5	5.6	6.7	9.1	5.4	4.9	6.1	6.2
7	26.3	13.6	13.2	14.9	21.4	17.8	22.9	17.5
8	7.3	6.5	6.9	13.2	9.6	10.8	11.7	8.8
9	19.9	34.8	32.0	24.0	23.3	16.7	18.0	26.2
10	1.3	2.0	3.8	4.1	9.0	21.1	11.6	6.6
11	5.5	7.4	3.1	4.1	2.5	.9	1.0	4.3
12	1.6	16.6	17.7	13.9	13.2	6.3	5.5	12.0
13	.3	2.0	3.3	3.0	3.2	3.0	2.1	2.4
U.S.	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

^a Prepared by Western Livestock Marketing Research Technical Committee and Bureau of Agricultural Economics, U.S.D.A. from O.P.S. reports.

^b Region 1—Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont.

Region 2—New Jersey and New York.

Region 3—Delaware and Pennsylvania.

Region 4—District of Columbia, Maryland, North Carolina, Virginia, and West Virginia.

Region 5—Alabama, Florida, Georgia, Mississippi, South Carolina, and Tennessee.

Region 6—Kentucky, Michigan, and Ohio.

Region 7—Illinois, Indiana, and Wisconsin.

Region 8—Minnesota, Montana, North Dakota, and South Dakota.

Region 9—Iowa, Kansas, Missouri and Nebraska.

Region 10—Arkansas, Louisiana, Oklahoma, and Texas.

Region 11—Colorado, New Mexico, Utah, and Wyoming.

Region 12—Arizona, California, and Nevada.

Region 13—Idaho, Oregon, and Washington.

The regional proportions shown in Table 1 are divided by grade of beef in Table 2. Regions differ considerably in their breakdowns. Extremes include Region 2 (New Jersey and New York), which slaughters 75 per cent Prime and Choice beef and Region 10, which slaughters 75 per cent Utility, Canner and Cutter, and Bulls. The national picture shows 30 per cent Choice beef, 12 to 14 per cent each of Prime, Good, Commercial, Utility, and Canner and Cutter, and six per cent Bulls. These extreme regional differences in quantities and in grades show the need

for interstate movements of dressed beef to equalize supplies of all grades.

Data showing per capita consumption of beef, pork, and mutton by these same regions are not available. Tentative regional estimates have been prepared by the Bureau of Agricultural Economics using slaughter and transportation data and some refinements of data gathered in a food

TABLE 2. DISTRIBUTION OF SLAUGHTER OF CHILLED CARCASS BEEF BY GRADES WITHIN REGIONS AS REPORTED BY CLASS 1 AND 1A SLAUGHTER TO O.P.S.—JUNE–NOVEMBER, 1951^a

Re- gion ^b	Prime	Choice	Good	Com- mercial	Utility	C & C	Bulls	Total
	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent
1	11.5	18.3	7.0	11.1	15.7	28.1	8.3	100.00
2	49.3	25.9	6.4	4.2	3.9	5.2	5.1	100.00
3	17.1	25.9	10.6	11.6	12.9	18.2	3.7	100.00
4	5.8	25.4	18.2	14.7	11.5	16.0	8.4	100.00
5	1.3	10.9	11.3	16.3	19.0	27.4	13.8	100.00
6	13.0	27.4	12.6	17.6	12.6	11.1	5.7	100.00
7	18.5	23.4	8.8	10.2	17.4	14.2	7.5	100.00
8	10.2	22.2	9.1	18.0	15.6	17.2	7.7	100.00
9	9.3	39.9	14.2	11.0	12.7	8.9	4.0	100.00
10	2.3	9.1	6.8	7.5	19.6	44.5	10.2	100.00
11	15.7	51.8	8.6	11.4	8.2	3.0	1.3	100.00
12	1.7	41.6	17.2	13.9	15.7	7.3	2.6	100.00
13	1.6	25.6	16.1	14.9	19.0	17.6	5.2	100.00
U.S.	12.3	30.0	11.6	12.0	14.3	14.0	5.8	100.00

^a Prepared by Western Livestock Marketing Research Technical Committee and Bureau of Agricultural Economics, U.S.D.A. from O.P.S. reports.

^b Region 1—Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont.

Region 2—New Jersey and New York.

Region 3—Delaware and Pennsylvania.

Region 4—District of Columbia, Maryland, North Carolina, Virginia, and West Virginia.

Region 5—Alabama, Florida, Georgia, Mississippi, South Carolina, and Tennessee.

Region 6—Kentucky, Michigan, and Ohio.

Region 7—Illinois, Indiana, and Wisconsin.

Region 8—Minnesota, Montana, North Dakota, and South Dakota.

Region 9—Iowa, Kansas, Missouri, and Nebraska.

Region 10—Arkansas, Louisiana, Oklahoma, and Texas.

Region 11—Colorado, New Mexico, Utah, and Wyoming.

Region 12—Arizona, California, and Nevada.

Region 13—Idaho, Oregon, and Washington.

consumption survey of 68 cities by the Bureau of Human Nutrition and Home Economics, U.S.D.A., in 1948. Per capita consumption of beef was about the same in all areas except the South, where it was somewhat lower. These data are not yet available for release because of some differences of opinion regarding their validity.

Extent of Meat Shipments

The extent of meat shipments is indicated by an analysis of railroad movements of fresh meats for 1950 by the Western Livestock Marketing

Research Technical Committee and the Bureau of Agricultural Economics, U.S.D.A., using Interstate Commerce Commission publications. These data are incomplete since truck movements are not covered, but they indicate the general direction of movement. Outshipments were substantial only from Iowa, Minnesota, Missouri, Nebraska, and Illinois.

States making outshipments included all the North Central states except Ohio and Michigan, plus Colorado and Utah in the West, Oklahoma in the Southwest, and Kentucky and Tennessee in the South.

Major inshipments were to New York, Pennsylvania, New Jersey, Michigan, and the New England states. All other states in the East, South and West imported lesser amounts. No breakdown between beef, pork, and mutton is available. Since beef and pork production are largely concentrated in the same areas, the movements are undoubtedly outward from the North Central area in both cases.

This generalized information establishes the major lines of movement but fails to describe the distribution of meat by grade. The major packers indicate that the heaviest beef is consumed in New England and that demand is progressively for lighter beef in the warmer areas. The lightest beef is consumed along the Gulf Coast and it is produced in that area. Since grades are not considered in government reports of meat movements, only the packers have definite information for this area.

Regional surpluses and deficits of meat of different grades vary from month to month. The result is a constantly shifting pattern of movement. The most confusing aspect is the two-way movement which occurs in many states with meat of some grades moving out and meat of other grades moving in. This movement provides most of the interregional competition which now exists. Unfortunately, it is not measured accurately and only generalizations can be made about the extent of competition.

A few tentative conclusions can be drawn regarding interregional competition in beef. Since the seven states of Illinois, Indiana, Wisconsin, Iowa, Kansas, Missouri, and Nebraska produce almost half of the Prime, Choice, and Good grades, they constitute the major source of these grades. Other states probably having surpluses of these grades are Minnesota, South Dakota, and North Dakota and they must compete for a market. The states of Arkansas, Louisiana, Oklahoma, and Texas lead in production of Canner and Cutter beef and three-fourths of the beef slaughter in these states falls in the lower grades. Outshipments from these states are not substantial but must be of the lower grades. Surpluses in the other states are seasonal and relatively minor. Increased production in some states in the future may change substantially the present competitive situation.

INTERREGIONAL COMPETITION IN DAIRYING

With Special Reference to the Midwestern and Southern Areas

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THE principles of comparative advantage, specialization, and other economic principles, which constitute the theoretical framework for treatment of the question of interregional competition, have been well summarized elsewhere and will not be repeated here.¹ Moreover, the following discussion deals only with the economic aspects of the problem, omitting entirely the question of artificial trade barriers. The impeding influences of such barriers on the movement of milk between markets, states, and regions, is recognized nevertheless, as a matter of major concern in a complete analysis of the problem.

From the standpoint of interregional competition, dairy farming is somewhat unique among agricultural enterprises in the United States. First, commercial production of few other major farm commodities is so widely distributed throughout the country as is milk production. In 1951, one per cent or more of the nation's total milk supply was produced in each of 31 states. The second unique feature of dairying is that all milk on farms is potentially one commodity, but as it moves into the marketing channels it becomes, in effect, two commodities—milk for fluid uses and milk for manufacturing uses. Furthermore, the supply-demand conditions influencing the production and marketing of the two commodities differ. Fluid milk production responds chiefly to local conditions while the production of manufacturing milk is more influenced by national conditions. In a discussion of interregional competition, it is therefore necessary to provide separate treatment for the two commodities.

Milk For Fluid Uses

The fluid milk phase of the dairy industry, which currently absorbs 60 per cent of total milk production, accounts for the wide geographic dispersion of dairy farming. Due to the bulky and perishable characteristics of the product, fluid milk production is almost entirely unaffected by type of soil, climate, and other locational factors which delineate areas of comparative advantage for most agricultural commodities. The extent of specialization in fluid milk production in a given area is usually limited to the volume of product which can be marketed in adjacent consuming centers.

¹ R. L. Mighell and J. D. Black, *Interregional Competition in Agriculture*, Chaps. I and II, Harvard University Press, Cambridge, Massachusetts, 1951.

Although some fluid milk is moved interregionally, the high transfer costs arising from its low value-weight ratio and perishable nature make its movement almost prohibitive except in cases of unusual circumstances. The following data on Class I milk prices at potential shipping and receiving points, with estimated costs of transferring milk between these points, give some indication of the feasibility of interregional movements of fluid milk.

Potential Receiving Points	Local Class I Price 1951	Estimated Cost of Receiving Milk from Barron, Wisconsin				Difference ⁴
		Barron Class I Price ¹	Tank-Truck Transporta- tion Rate ²	Other Costs ³	Total Costs	
		Dollars Per 100 Pounds				
Birmingham	6.23	4.05	1.93	.25	6.28	-.05
Dallas	5.88	4.05	1.97	.25	6.32	-.44
Memphis	5.44	4.05	1.64	.25	5.99	-.55
New Orleans	5.68	4.05	2.55	.25	6.90	-1.22

¹ Chicago Class I price for 1951 adjusted to Federal Order Zone 21 where Barron, Wisconsin is located.

² Insulated tank-truck transportation rates, courtesy of Hugh L. Cook, associate professor of agricultural economics, University of Wisconsin.

³ Estimated allowance for receiving, cooling, shrinkage, and brokerage fees.

⁴ Local Class I price per 100 pounds paid in the respective markets minus the cost per 100 pounds for milk imported from Barron, Wisconsin.

From these data it is apparent that during 1951 none of these four Southern markets could have received milk from Barron, Wisconsin, a leading Midwestern shipping point, at a cost comparable to local Class I prices.² It is assumed that the delivered cost for milk obtained from other points in the Midwest area would not be greatly different. Lower transportation costs from less distant shipping points likely would be offset by higher milk prices. The relation between Southern and Midwestern Class I milk prices may change from time to time, but it is almost inconceivable that such changes could be of sufficient magnitude to offset the high transfer costs which currently prohibit full-scale competition for Southern markets by Midwestern production areas.

Although year-round inshipments have been negligible, many areas of the South have long depended on outside sources for supplementary milk during the fall and winter seasons. It is doubtful, however, if milk inshipments reached significant proportions before World War II. Principally because of the expanded demand for fluid milk and more rigid enforce-

² The average Class I price in Barron, Wisconsin, during 1951 was only 43 cents greater than the average pay-price of 18 midwestern condenseries. A spread appreciably less than this would perhaps induce milk producers to shift from the production of fluid grade to manufacturing grade milk.

ment of sanitary regulations, the need for supplementary milk increased greatly during the decade of the 1940's. This milk came largely from Midwestern milk production areas.

Limited information available only for the period 1947-50 indicates, however, that such movements are declining.³ This is due primarily to the influence of two factors. First, wide price differentials which have existed between the two grades of milk in the South during the last few years have encouraged a rapid increase in local fluid milk production. Secondly, many areas of the South have adopted fluid milk pricing plans which encourage greater uniformity in milk production.

Since fluid cream has a relatively high value-weight ratio, this product is of major concern in evaluating the extent of interregional competition between some areas of the country. Because of the high butterfat content of milk produced in the South, however, there is currently a surplus of cream in much of the area and, consequently, a very limited demand for this commodity from outside sources.⁴

Fluid milk substitutes also may warrant consideration in the study of interregional competition in dairying. For the country as a whole, processed dairy products do not compete seriously for the fluid milk market, but in the South, direct consumption of these products per capita runs more than twice as high as in other areas of the country.⁵ Also during the periods of deficit milk supplies in many Southern areas, additional quantities of these products are consumed indirectly through the use of fluid milk by-products made from reconstituted milk. The extent of competition from processed dairy products for the fluid milk market thus appears to be quite significant in the South.

Technological developments in the processing of fluid milk may eventually cast new light on the possibilities of expanded interregional competition in fluid milk production. Early results from trial runs of concentrated and sterilized milk products have not been too encouraging. This is perhaps due, in part, to the small difference between retail prices of the concentrated products and conventional products in markets where concentrated milk has been available. As the concentration process is further perfected, however, and the "old product inertia" of consumers is dissipated, there is little doubt that this development will lead to considerable expansion in the fluid milk market. With the limited information

³ Unpublished data made available by Hugh L. Cook, University of Wisconsin and Lewis P. Jenkins, Mississippi State College.

⁴ *Seasonality of Supply and Utilization of Milk in the South*, Southern Cooperative Series Bulletin No. 25, Mississippi Agricultural Experiment Station, State College, Mississippi, July, 1952.

⁵ "Dairy Products in City Diets," Commodity Summary No. 6, Bureau of Human Nutrition and Home Economics, United States Department of Agriculture, Washington, D.C., February, 1950.

available one can only speculate on what effects this innovation may ultimately have on the structure of the fluid milk market. Assuming that the costs of transportation are reduced proportionately to the weight reduction of milk by the concentration process, it is obvious that current differentials between southern and midwestern milk prices will provide a strong incentive for expanded shipments of Midwestern milk to Southern markets.

It is reasoned that such a development would activate competitive forces to the extent that at least a part of the current differential in milk prices between the two areas would be short lived. Cheaper milk from outside production areas would, of course, create a depressing influence on local milk prices. This would perhaps mean the elimination of some of the marginal milk producers as well as the encouragement of greater production efficiency by those remaining in the business. Assuming no interference from artificial trade barriers, the difference in Midwestern and Southern milk prices cannot long remain greater than the cost of transferring milk between the two areas, irrespective of the form in which the milk is marketed.

Milk for Manufacturing Uses

Geographic distribution of milk production for manufacturing uses shows little resemblance to the geographic pattern of fluid milk production. While milk for manufacturing uses is equally as perishable as milk for fluid uses, the practice of processing at the source of supply, irrespective of location, reduces the market restrictions arising from the bulkiness of the product. Finished manufactured products have a high value-weight ratio, and so may be shipped great distances at relatively low cost. Thus, most manufactured dairy products are produced for a national market and, in most cases, do not retain the identity of the production area.

Because of these characteristics, production of manufacturing milk is directed by general economic influences in much the same manner as cotton, tobacco, and many other farm commodities. Production of manufacturing milk, therefore, is most concentrated in those areas which have greatest comparative advantage for the production of this commodity.

The North Central region has long held a dominant position in the production of milk for manufacturing. This is due perhaps in part to technical heritage of early settlers, but also to the combination of physical factors which characterize this area. The following data showing production of three principal dairy products—creamery butter, American cheese, and evaporated milk—by five-year periods, 1930-50, indicates the extent to which this area dominates the dairy manufacturing field.

It is noted that the production of all these products in the North Cen-

tral region constitutes a major portion of the total output for the United States. Noted too, that production of creamery butter and American cheese showed a slight upward trend relative to total U.S. production throughout the period.

Production of manufactured products was consistently downward relative to total U. S. production in all other major regions except the South Central. In this area, the production of both American cheese and evaporated milk showed significant gains. In 1930, cheese production in the South

Period (Annual Averages)	Creamery Butter ¹		American Cheese ²		Evaporated Milk	
	Production in Millions of Lbs.	Per Cent of U.S.	Production in Millions of Lbs.	Per Cent of U.S.	Production in Millions of Lbs.	Per Cent of U.S.
1930-34	1,306	78	297	75	990	63
1935-39	1,296	77	378	74	—	—
1945-49	1,027	79	657	75	1,892	61
1950	1,106	80	682	76	1,624	57

¹ Including whey butter.

² Made from whole milk.

Source: "Production of Manufactured Dairy Products," Bureau of Agricultural Economics.

Central region constituted about six per cent of the country's total output, as compared to 12 per cent in 1950. Evaporated milk production during the same years was seven and 15 per cent of the total, respectively. Creamery butter production constituted about seven per cent of total U. S. production during the entire period.

The relative declines in the production of manufactured dairy products in other regions was due, principally, to competition for milk supplies from expanded fluid milk markets. Between 1930 and 1950 the United States population increased 28.1 million or 23 per cent. Meanwhile, consumption of fluid milk and cream per capita increased from 350 pounds to 393 pounds annually, or by 12 per cent.⁶ The combination of increases in these two variables resulted in a 38 per cent increase in the amount of milk required for fluid milk uses. During the same period, milk production increased 18 per cent. Thus, a large quantity of the additional milk necessary to fulfill the fluid milk demand was drawn from production which previously had gone into non-fluid uses.

In the South, a significant part of the additional fluid milk was supplied by the increased proportion of total production which was sold off farms. Between 1930 and 1950, milk production per capita in the Southern

⁶ *The Dairy Situation*, U. S. Bureau of Agricultural Economics, March, 1951.

Dairy Marketing Region⁷ increased only two per cent, but during the same period, sales off farms per capita increased by 28 per cent.⁸ Comparable figures for the U.S. were a two per cent decrease in milk production per capita and a three per cent increase in milk sales.

The North Central region will no doubt continue to supply the major portion of the nation's manufactured dairy products during the foreseeable future because of its favorable combination of physical and technical resources, as well as its locational advantages. Production trends of the last 20 years, however, suggest that the South may become increasingly important in this field of production. Other developments in southern agriculture also lend support to this supposition. During the last quarter of a century, the pattern of agriculture in the South has been gradually shifting toward greater diversification. In the period 1924-28, almost 60 per cent of total cash farm receipts came from the sale of cotton and cotton seed, and other crops returned slightly more than half of the remainder. During the period 1946-50, returns from each of the three principal income sources—cotton, other crops, and the livestock enterprises—constituted about one-third of the total.

The livestock enterprises showed the greatest relative gain as a source of cash farm income during this period. Returns from livestock farming increased from 20 per cent of total cash farm receipts in the earlier period to 33 per cent of the total in the current period. Returns from dairy farming did not keep pace with the upward trend from all livestock enterprises during this period, principally because of the unfavorable relationship between beef and dairy product prices. The weak competitive position of dairying, pricewise, is quite apparent from the index of the milk-beef farm price ratios from 1920 through 1951.

Period (Averages)	Index ¹	Period (Averages)	Index ¹
1920-24	126	1940-44	88
1930-34	104	1945-49	81
1935-39	89	1950-51	54

¹ Index of the quantity of beef equivalent in value to a unit of milk based on national farm prices for the two commodities (1922-41=100).

These data show that dairy prices have continued a sharp decline relative to beef prices since the depression years of the early 1930's. This is

⁷ The Southern Dairy Marketing Region refers to the group of Southern states currently engaged in cooperative dairy marketing research. Included are Alabama, Arkansas, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, and Texas.

⁸ *Trends in the Production and Disposition of Milk*, Southern Cooperative Series, Bulletin No. 19, Mississippi Agricultural Experiment Station, State College, Mississippi, December, 1951.

explained by the relative price and income elasticities of beef and dairy products which cause basic differences in the price behavior of the two commodities during periods of fluctuating price levels. Assuming a continuation of current developments in the supply-demand conditions of the two commodities, the next few years probably will show a reversal of the current trend in the beef-milk price ratios. As dairying has continued to show some progress in spite of relatively unfavorable prices, a change in this situation will likely encourage an accelerated expansion of the South's dairy industry.

It seems apparent that the South holds some advantage over other areas of the country in certain physical resources for milk production. Due perhaps to the impeding influences of limited capital and other factors of an institutional nature, however, progress toward the solution of production problems in the South has been slow relative to that in other parts of the country. While continued expansion of dairying in the South seems inevitable, the rate of expansion will depend on the rate at which solutions to these problems are forthcoming.

INTERREGIONAL COMPETITION—POULTRY AND EGGS

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FEW, if any, subjects in recent years have attracted as widespread interest among research workers as that of interregional competition in the production and marketing of poultry and eggs. Hardly has the ink dried on the results of some major studies of interregional competition when other researchers get interregional ideas and begin to plow the same fields of data again with the same tools.

Appraisal of Achievements and Problems

It is not the purpose of this statement to reiterate the findings of the many studies¹ that have been made concerning interregional competition, and especially those concerning the production of poultry and eggs. Rather, it is a brief appraisal of the work that has been done, and mentions some of the problems involved in a study of interregional competition.

Work to date has been based almost entirely on data from three major sources. The first of these is census information concerning the number of farms, chickens and broilers raised, egg production, values, and similar data. This is good information and certainly has been used to advantage. However, the farm definitions used by census enumerators, especially with a doubling of the price level in recent years, leads one to wonder how many five acre "building lots" have been included as farms. These are important with poultry production and may become more so as the trend to suburban living continues. They raise this question—Do the small, part-time producers respond to the same degree to economic forces as do *bona fide* poultrymen?

¹ *Analysis of Interregional Competition in Agriculture*, BAE, USDA, Washington, D.C., April, 1939.

John D. Black, and Ronald L. Mighell, *Interregional Competition in Agriculture*, Harvard University Press, Cambridge, Massachusetts, 1951.

Raymond P. Christenson, and Ronald L. Mighell, *Interregional Competition in the Production of Chickens and Eggs*, Technical Bulletin No. 1031, USDA, July, 1951.

S. E. Johnson, "Interregional Competition and Comparative Advantage in Agriculture," *This Journal*, February, 1937.

C. Delmar Kearl, *An Economic Analysis of New York Production of Eggs*, Thesis, Cornell University Library, 1949.

S. T. Rice, *Hatching Egg Procurement and Interregional Competition in the Commercial Hatching Egg Industry*, Bulletin No. 293 (Technical), University of Delaware, Agricultural Experiment Station, January, 1952.

S. T. Rice, *Interregional Competition in the Commercial Broiler Industry*, Bulletin No. 290 (Technical), University of Delaware, Agricultural Experiment Station, April, 1951.

A second source of information is the production and price reports published by the United States Department of Agriculture. The use of these price and production data as state averages have been questioned in many areas. The criticisms stem primarily from the peculiar characteristics of the poultry industry in certain areas and also come from the technician's query as to the reliability of a sample consisting of regular crop reporters.

The third major source of data is the cost studies made by the various State Experiment Stations. These studies, usually designed for a specific purpose and for which purpose the sample probably was adequate, often are used as state average data in comparisons with data for other states. One should question seriously any broad use of conclusions reached from the analysis of unrelated studies.

The interregional competition studies that have been made in the poultry and egg field indicate broadly that while the geography of production has an important bearing on interregional competition, other factors are more important. Differences in prices received by farmers in various areas of the United States reflect mostly quality, type of outlet, and form of product differences rather than distance to market.

The labor factor appears to be the one most important consideration in interregional competition for poultry and eggs. Not only does this involve the supply of labor, but labor costs, output per worker, alternative uses for labor, and the minimum wages for which hired and other labor will work.

Differences in the prices of commercial feed between regions have been small. However, differences in kind of feed used and prices for the typical poultry ration do vary importantly but are of less importance than one might expect because they are tied up with the system of poultry production. Chick prices too are of small importance because of the regional or even national markets supplied by many of our important hatcheries.

In brief then, it appears that the major factors involved in interregional competition for eggs are quality of product, type of outlet, and labor. For poultry, labor, type of outlet, and form (live, ice packed New York dressed, or drawn) are the important factors. Not only do these factors need to be studied in more detail, but we need information not now available from any source.

Present Data Not Completely Reliable

The foremost problem in interregional studies is the limited reliance and confidence which can be placed in data now at hand. We need more reliable and more comparable information upon which to base studies of

interregional competition. The use of the gross data omits some of the important considerations concerning the place of the poultry enterprise in the farm organization, which may be of real importance in affecting the permanence of the poultry industry on a farm or in a particular area. Certainly, poultry as a "pin-money" or part-time enterprise will respond far differently from that where poultry is one of the major enterprises that occupies the time of the farm operator.

A second major problem is the question of alternative opportunities for labor as well as minimum wages which labor will accept if there is no reasonably good alternative. Comparable information on this factor would be most valuable to those studying interregional competition but it is most difficult to obtain. This would suggest that relatively less time should be spent studying the broad trends, which are the result of certain basic factors. That way more emphasis could be placed on an analysis of the underlying causal relationships so that our studies would be more prospective and less retrospective.

A third problem involved in recent studies of interregional competition is that the poultry industry has been faced with a tremendous expansion in the market for both eggs and poultry meat. Not only has our population been expanding rapidly, but during the past few years, the per capita consumption of eggs has risen from about 300 to over 400 eggs per year and poultry meat, including turkey, has risen from about 20 to over 35 pounds. Such unusual market expansion, in addition to the unpredictable and often political market situations caused by federal supports, has minimized interregional as well as intraregional pressures. This has resulted in a far broader expansion of poultry production than might be indicated by comparative advantages under a relatively steady market situation.

Another problem that deserves mention, and one which is associated with the use of gross data, is the "watered down" effect that results from the use of areal data when the areas are contiguous, as in a comparison of the North Atlantic states with the North Central states. Certainly, the border areas are not too unlike and serve only to minimize the differences between the more distant areas. This, while less true for broilers than for eggs, certainly appears to be a justification for the analysis of data on the basis of areas not commonly associated with political boundaries.

A problem that merits chief attention is that of technological developments in poultry production. The past 15-year period has been one of remarkable achievements, technologically speaking, and the next 15 years may be even more spectacular. These developments generally are of greatest benefit to those with other economic advantages and likely will either hasten the interregional segregation of production or tend to

shift from time to time the relative advantages of the different areas. However, the job of measuring the impacts of new developments is a continuous one as acceptance of the practices or developments spread and is most difficult to carry out.

It seems that there is merit in having developed a continuing study of interregional competition, based on as comparable, as reliable, and as complete data as it is practical to obtain. Such a study will not only serve as a continuous forward-looking predictive type of guide for producers but will give the industry a continual "meter reading" of the impact of technological changes on production. To obtain the necessary information for such a study and to properly analyze such is a tremendous undertaking, especially when one considers (1) the ability of economists to predict and (2) the difficulty of using the concept of comparative advantage. Not all research agencies are in a position or would need to participate, but a few well-chosen agencies, tightly integrated as to procedures and methods, could render a highly useful service by keeping a spotlight on the forces involved in interregional competition. For the bulk of the research agencies, there are enough intra-state and intra-regional problems, competitive and otherwise, to keep their poultry researchers busy for some time.

THE BEHAVIOR OF MARKETING MARGINS

Chairman: Glenn R. Smith, Office of Experiment Stations

THE BEHAVIOR OF MARKETING MARGINS ON CITRUS FRUITS*

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TO TALK about and do some research on margins is now quite fashionable among those working in the areas of marketing and prices. The recent upsurge of interest in margins was stimulated by appropriations made with the expectation that marketing research would uncover solutions to problems facing marketers, and that as a result margins could be narrowed with much of the gain accruing to farmers. Although few, if any, such solutions have yet been developed, we are accumulating an inventory of information on margins for many products. My objectives are, first, to indicate the nature of some of the margin information becoming available for citrus products, and then to make some general points about research on margins. Due to time limitations my remarks will be limited to fresh citrus, particularly oranges.

Fresh Oranges Serve As Example

Fresh oranges serve as an interesting vehicle for margin analysis. Their prices reflect interregional competition in production and trade, demand interrelations among various grades and sizes of the fruit and fresh and several processed forms. The fresh product is distributed nationally, with the marketing process reflecting participation by many types of private firms as well as prominent marketing cooperatives. And for a period of almost two decades ending in recent months, weekly shipments from California to Arizona were regulated under the operations of federal marketing agreements.

Margin information of the usual type has long been available for oranges through the pioneering studies of the U. S. Bureau of Agricultural Economics. To provide information which those studies were not designed to obtain, primary data were collected from a sample of over 50 retail outlets in Denver, Colo. Those data, reflecting the complete experience of the sample stores in their purchase and sale of citrus products for a whole year, provide the basis for the determination of daily and weekly margins. These margins, to which I shall now refer, reflect the broad

* The Gianni Foundation Paper No. 131.

over-all averages for all grades and sizes of oranges grown in the major producing areas and sold in the stores. Specific margins by size and grade of fruit, by state of origin of the fruit, and by type of store also have been analyzed, but time precludes their consideration except for the few observations to be made on margins in various sizes of stores.

The annual average retail margin for oranges during the year studied was nearly 3.5 cents per pound, with the average weekly margins ranging from 2 to 5 cents per pound. When expressed in relation to the retail price, the average margin was about 30 per cent. But I shall not expand my remarks into a detailed quantitative account of this type. You could not be expected to remember such results, and they soon will be published in some detail. Also, I doubt that the bare statement of such average margins is, in itself, very meaningful.

Absolute Margins Positively Coordinated with Prices

Of more significance, perhaps, is the fact that the cents-per-pound, or absolute margins, are positively correlated with both the wholesale and retail prices. But percentage margins, or the absolute margins expressed as a per cent of the retail prices, are negatively correlated with both the wholesale and retail prices. It is of some interest, especially when considering pricing policies and practices of retailers, to know that the cents-per-pound margin is more closely related to the retail price than is the percentage margin. These general tendencies prevail for most small, medium, and large volume stores. But certain differences exist among the magnitudes of margins when the size of the stores is considered.

The large volume stores tend to have lower absolute and lower percentage margins than do the small and medium stores. The margins in the large outlets, however, are not consistently lower. In the larger stores, there is a clearly noticeable tendency to set retail prices so as to yield lower margins for brief periods which are irregular in length but not infrequent in occurrence. Between such periods the large-store margins are at about the same level as those in the medium and most small stores. Thus, lower over-all average margins in the large stores reflect the practice of using fresh oranges as one of the "sale items" or special inducements to attract trade, a device which is firmly embedded in the fabric or retail food merchandising by volume outlets.

While considering the differential behavior of orange margins in various sizes of stores, it may be noted that in neither the large, medium, or small stores does a simple policy on margins seem to prevail. One might hope to discover for certain types of stores a consistent policy of using some constant absolute or percentage markup.

There is some evidence that the large stores tend to use fixed percentage

margins more than do small stores, and that small stores tend more to use fixed absolute margins, but the numerous exceptions in both cases urge one to defer judgment on this matter until more evidence is available. And it is also not yet wholly clear why particular margins are used by stores in their pricing policy, although the evidence suggests that short-run profit maximization is not the underlying motive. The hypothesis that long-run profit maximization, with consideration given to uncertainty and expectations, is the rationale is yet to be confirmed or rejected.

This question of pricing policy and its study by means of the analysis of margins may be touched upon by reference to some results on the behavior of daily margins. Statistical analysis of daily margins for oranges in retail outlets clearly shows that most stores have their retail prices and margins tied to the prices they paid for the oranges. Retail price appears to be more closely related to original cost than to replacement cost. The current wholesale price may change considerably, yet the retail price retains its level which was set by the application of a margin to the wholesale price paid by the retailer for the particular lot of oranges. Thus, over short periods of time, the current retail price tends to lag behind the current wholesale price.

This type of relation found in the analysis of orange prices and margins is contrary to some of the folklore on marketing margins for fresh fruits and vegetables. There is widespread the notion, especially in trade circles, that when the wholesale price advances the retail price quickly follows; but when the wholesale price declines, the retail price lags behind. Thus, this view considers retailers to be quick in making price changes upward; but the same retailers are supposed to be sluggish in making price changes downward.

Our data, however, fail to support this conception of pricing behavior as typical of most retailers whether they operate large or small stores. The evidence strongly indicates that the current wholesale price may either advance or decline by a large amount, yet the retail price remains unaffected until the retailer acquires new inventory which he then prices according to the margin he uses and the cost of the new inventory to him. This type of pricing behavior, of course, is of relevance in appraising the effectiveness of varying f.o.b. and wholesale prices so as to mitigate periodic short-run gluts and shortages which have long been characteristic of marketing conditions in fresh fruits and vegetables.

Some Questions Regarding Research

Many other characteristics of orange margins may be mentioned, but I would like to use the remaining few minutes to raise some more general questions regarding research on marketing margins. My discussion thus

far emphasized the behavior of margins and their relations to other economic variables. This emphasis was given because I question the significance of descriptive statements such as: The retailer's margin for oranges averages 30 or some other per cent of the retail price. Unless the margin is related to other economic variables, the information lacks economic significance. One might reply that measurement of margins is of itself useful since margins help locate inefficient points in the marketing system. I need not, however, belabor the obvious; so-called "large" margins are not valid evidence of economic inefficiency. This brings me to the second question I wish to raise.

Too much of the current work on margins is devoid of economics. The compilation of data and the computation of margins absorbs such a large proportion of the resources allocated that little remains for use in economic analysis of margin behavior. Thus, most of the margin work is outside the stream of current economic thought although it has much to contribute. Analysis of margins, in terms of economic models of marketing systems, could clarify important aspects of current controversies on the theory of the firm and its pricing policies; it could contribute to other phases of economic thought such as the analysis of horizontal and vertical integration; and it could help to narrow the gap between economic theorizing based on unreal assumptions and business practices guiding the formation of market prices. If I were to close with a challenge or a plea, I would put it in terms of bringing the analysis of marketing margins closer to economic analysis.

BEHAVIOR OF MEAT MARKETING MARGINS

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THE Bureau of Agricultural Economics has directed its recent research in margins for marketing meat toward more precise explanations of the factors that underlie the behavior of such margins, as a basis for greater efficiencies in meat distribution. Knute Bjorka and Katherine Parr made definite contributions toward an understanding of meat marketing margins and Farstad, Larson, and Brensike have made substantial progress recently in explaining why margins are what they are. We can say, therefore, that some progress is being made beyond the stage at which "cost and margin research provides useful summaries, but tells us nothing," toward a more effective analytical type of research which might suggest efficiencies in distribution.

Our purpose today is to review some of the accomplishments of past research in regard to the behavior of meat marketing margins, to report on work currently in progress, and to suggest some of the difficulties and problems we have encountered in trying to make our research more effective.

Over-All Meat Marketing Margins

The margin or marketing charge is, of course, the difference between the retail price per pound of meat and its equivalent farm value. It includes the entire spread from the value of the live animal on the farm to the price of meat in the retail store.

The most striking feature of the behavior of margins for marketing meat is the relative stability of the actual marketing margin through long periods of time, during which prices at retail stores and at the farm show considerable variation.

BAE's "Market Basket" index shows that from 1920 to 1929, inclusive, marketing margins varied from 14.8 to 16.6 cents per retail pound of meat sold, a range of only 1.8 cents. During this period, the farm value of meat varied from 11.1 to 17.7 cents per pound, a range of 6.6 cents. The "Market Basket" figure represents the average per pound retail costs of 335.4 pounds of meat, including 135.6 pounds of beef, 16.7 pounds of lamb, 157.5 pounds of pork, including lard, and 25.6 pounds of other meat products.

We do not mean to say that marketing costs do not change. They do change. But, the changes occur more slowly and to a lesser extent than do retail prices. The average spread of about 8 cents per retail pound between farm and retail prices before World War I was lower than it has

been at any time since. Between 1917 and 1921, the margin gradually adjusted upward to 16 cents a pound. This was double the margin prior to World War I. It allowed for higher wages, transportation charges, and other costs. Between 1931 and 1941, marketing charges appeared to adjust to a lower level of costs and also to reflect possibly greater efficiencies in distribution. Historically, however, there was no justification for any such assumption that marketing costs would go down.

Following the removal of price controls in 1946, over-all margins increased sharply in an apparent period of transition or adjustment to the higher level of prices, wages, and costs which resulted from the general price-cost rise from 1946 to 1948. Margins rose from 14.0 cents per retail pound in 1946 to 23.0 cents in 1948. In the most recent period since 1950, meat marketing margins have been under the regulation of the Office of Price Stabilization. The impact of price regulations on margins since late 1950 remains to be determined.

Percentage wise, livestock prices fluctuate a great deal more violently than retail meat prices. The relatively stable margin multiplies the variations in retail prices into much wider fluctuations of prices and income received by farmers. When prices are low, a relatively large share of the consumer's meat dollar goes for processing and distribution. Conversely, when prices are high, a larger percentage share is received by livestock producers. In the depression year of 1932, only 34 cents of the consumer's meat dollar went to the producers; 66 cents went in payment for marketing charges. Today these proportions are exactly reversed; the producer receives 66 cents and the remaining 34 cents go for marketing charges. In 1939, the consumer's meat dollar was divided almost equally between the producer and marketing agencies.

The reason for this marked stability of per unit meat marketing margins is that a number of marketing costs, such as labor, rents, materials and supplies, transportation charges, taxes and interest on fixed investments, are rather inflexible over short periods of time. Present indications are that cost of labor will take on more of the features of a fixed charge than it has in the past. As a result, margins that reflect marketing costs will tend to change more slowly than prices of either meat or livestock.

Margins by Marketing Functions

Retailing has continually taken the largest, although a somewhat declining share of the total meat marketing margin. Fifty per cent of the total meat marketing margin was taken at the retail level in 1932. This compares with 49.0 per cent in 1939, and 44.9 per cent in 1947. Although retail margins declined percentage-wise from 1932 to 1939 and to 1947, actual retail margins increased from 6.6 cents in 1932 to 9.0 cents in 1947.

Meat packing took 30.3 per cent of the total marketing margin for meat in 1932 and 1939, but this percentage increased to 37.1 in 1947. Wholesaling took about 12 per cent in each period, and marketing live-stock declined from 7.6 per cent in 1932 to 6.4 per cent in 1947.

Retailing

Retailing is the largest single cost item included in the marketing charges for meats and meat products. Paradoxically, it is the function on which the least research has been conducted and for which the least information is available. Some BAE activities, as well as those of the North Central and Western RMA regional groups, are being directed toward this aspect of meat distribution.

In general, three aspects of retailing are being considered under the broad heading of efficiency in retail meat distribution. They are: (1) The costs of retail operation, (2) retail meat margins, and (3) retail marketing practices and services. Depending upon the results obtained from studies under way, we anticipate that more specific problem areas in retailing will be found, for which additional research efforts might be fruitful.

The results of recent research regarding retail operating costs will be considered under the following topics: (1) the great variation of operating costs among retail stores; (2) the relation between unit operation costs and volumes of meat handled; and (3) the relative importance of various cost items in meat retailing.

(1) Variations of Operating Costs

From the tremendous variations in retail operating costs that are present among individual stores, it is apparent that possibilities exist for the achievement of a more efficient retail distribution. A lowering of operating costs could come about either through a change in (1) our present retail marketing structure, which would involve a radical adjustment in size and location of stores and in volume of meat handled; or (2) possibly through some change in retailing methods, such as a rise in sales of frozen meat, or centralized prepackaging of meats.

In a study of retail meat stores (member stores of chains excluded) great variations were noted in retail operating costs among the sample stores. For example, the average total cost per store in Bridgeport, Conn. for retailing a pound of meat (wholesale weight) was 13.4 cents. The standard deviation was almost one half of the mean, 5.9 cents. Hence, about two-thirds of the total number of stores had operating costs that ranged from 7.5 cents to 18.3 cents a pound. The coefficient of variations was 44 per cent. Similar variations were noted for Harrisburg, Pa., and Topeka, Kan.

(2) Relations Between Operating Costs and Volumes

Much of this variation in cost for the stores studied can be explained in terms of quantities of meat handled. In the report, "Costs of Retailing Meats in Relation to Volumes," by Farstad and Brensike, the obvious fact that operating costs declined with increases in the quantity of meat handled was clearly brought out by the record obtained from stores in the three cities.

Of greater importance, perhaps, is the fact that decreasing unit costs were associated with increasing volumes until a volume of about 4,000 pounds of meat per month was reached. After this quantity was reached in each of the three studies conducted by the Bureau of Agricultural Economics, the tendency for further decreases in unit costs appeared to have diminished considerably as quantities handled increased. The number of observations beyond the 4,000-pound level were not sufficient, however, to indicate conclusively the precise relationship. Nevertheless, any reduction in cost that may be associated with increases of more than 4,000 pounds a month in quantities handled appears to be slight.

Census information shows that about 80 per cent of the combination grocery and meat markets, the dominant type of retail meat outlet in the United States, handle less than 4,000 pounds of meat a month. These stores together handled about one-third of the total retail sales of meats. From the standpoint of store numbers, a large proportion of stores operated at relatively high operating costs and were at a competitive disadvantage. For example, stores handling less than 1,000 pounds of meat per month in Bridgeport had operating costs of 21.2 cents a pound. This compares with an average cost of 13.2 cents a pound for stores handling between 1,000 and 4,000 pounds, and a total average cost of 7.8 cents a pound for stores handling 4,000 pounds and more of meat per month.

(3) Relative Importance of Various Cost Items

Labor was the chief cost in retailing meat. Payments for wages of salaries, including costs of family labor, were equivalent to about 65 to 70 per cent of the total operating costs.

Rent was the next highest single cost item. The remaining items of expense included payments for light, heat, and power; license and insurance; depreciation of equipment, including delivery trucks; containers and wrapping supplies; maintenance; advertising; and miscellaneous items of expense. The total of these miscellaneous expenses was equivalent to about 22 per cent of the total operating costs in Bridgeport, 25 per cent in Topeka, and about 30 per cent in Harrisburg.

Retail operating costs and changes in such costs were reflected in retail meat margins and changes in margins. Gross retail meat margins repre-

sented the difference between total retail sales value and wholesale costs, which included procurement costs. Also, this difference allowed for the cost of processing and merchandising meats, and provided a return to the retailer for his services.

The relationship of operating costs to retailing margins varied only slightly from 1925 to 1950. For example, for about 30 stores in Chicago, operating costs represented about 88 per cent of the gross retailing meat margin during each of the years 1947-50. Profits, a residual, represented the remaining 12 per cent of the gross margin. During this period, gross retailing margins expressed as a percentage of sales increased about eight per cent.

From information presented by Tobin and Green in their study, "What Becomes of the Consumer's Meat Dollar," we estimated that operating costs for the 10 years from 1925 to 1934 amounted to 87 per cent of total retail gross meat margins. During this period, however, the proportion of gross margins represented by operating costs varied from 84 per cent in 1928 and 1930 to a high of 90 per cent in 1932 and 1934.

Difficulties in Retail Meat Margin Research

The volume of meats handled is important in explaining variations in operating costs among small-volume stores, where differences in volumes handled were relatively great. Considerable difficulty arises in trying to explain variations in operating costs among stores handling similar volumes, particularly as related to differences in retailing efficiency. The reason for our present difficulty is that very little information is available, either as to the importance of variation in types and kinds of meats among individual stores or as to the differences in the costs of fabricating various types and kinds of retail cuts of meat. If such variations prove to be important, present bases used in comparing operating costs among individual stores are not in themselves reliable indicators of relative efficiencies in retailing operations.

The two most common bases for expressing meat margins and costs are as a percentage of retail meat sales and as cents per wholesale pound handled. It is not likely, however, that both of these methods are reliable indicators of relative retailing efficiency. For example, we found in the Chicago study that stores score differently on an efficiency scale when operating costs are expressed as cents per pound than when such costs are expressed as a percentage of retail sales.¹

In attempting to analyze variations in operating costs among individual stores, some significance should be attached by researchers to the relative importance of various types and cuts of meat handled among stores.

¹ Coefficient of rank correlation, $r = .70$.

This fact is suggested by the high degree of association found between operating costs expressed as cents per pound and the average wholesale price paid for all meats handled in stores included in the Chicago study for 1950.² The variations noted in average wholesale price paid per pound of meat suggest something of the importance of variations in types and kinds of meat handled. Average wholesale prices ranged from 34 to 50 cents a pound for all meats handled in 1950. It is probable that differences in operating costs per pound of meat vary with differences in types of meat handled because of (1) differences in costs of fabricating beef, pork, lamb, and poultry, and (2) differences in selling costs per pound of meat that arise from the amount of handling and supplies required to cater to consumer request for units of a given type and size.

What does all this mean? To us it implies two things. First, we have gone far enough in our research to recognize unusual opportunities for increasing the efficiency of marketing meat and meat products at retail, provided there is a willingness on the part of the public to accept changes in marketing practices and a willingness on the part of marketing agencies to make such changes. Second, a more definitive type of work is essential before researchers can take the results of their work and use them with absolute confidence in pointing out specific areas for improvement and the means by which they could be accomplished.

² Coefficient of linear correlation, $r = .86$.

THE BEHAVIOR OF MARKETING MARGINS ON DAIRY PRODUCTS

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THE consumer's food dollar may be divided roughly into two parts—that received by the farmer and that going for receiving, processing, packaging, warehousing, transportation, and distribution. From 1929 to 1951, farmers received 44 cents and distribution¹ 56 cents of the consumer's food dollar as measured by items included in the family market basket (Table 1).

TABLE 1. AVERAGE PROPORTIONS THAT DISTRIBUTION MARGINS WERE OF THE
CONSUMER'S DOLLAR FOR SPECIFIC ITEMS, 1929-1951^a

1929-1951 Average Proportions	
<i>Item</i>	<i>Average</i>
Market basket margins	56
Dairy products margins	48
American cheese	45
Butter	29
Evaporated milk	59
Market Milk	
Home deliveries	51
Through stores	45

^a Data computed by Bureau of Agricultural Economics, USDA, for all items except market milk. Proportions shown are farmers' share of retail prices subtracted from 100. Data for market milk obtained from USDA Fluid Milk Reports. Distributors' margins are the difference between consumer prices for home deliveries and store milk and Class I prices (adjusted for fat test sold to consumers) paid to producers in 24 cities with populations of 300,000 or over.

Milk and its products are important items in the family market basket. According to one study, the dairy industry ranks fourth among the major manufacturing industries in the United States, being surpassed by iron and steel, meat products, and motor vehicles.² In foods, meat is the only product exceeding milk in amount of expenditures by consumers. For 1952 the estimated retail value of dairy products is \$8,900,000,000, of which farmers will receive around \$4,900,000,000, while about \$4,000,000,000 will go for distribution margins.

Distribution Costs Vary

The proportion of the consumer's food dollar going to distribution varies with different foods. Thus from 1929 to 1951 the distribution share

¹ For convenience in presentation, the entire margin for receiving, processing, packaging, warehousing, transportation and distribution is termed "distribution" in this paper.

² Roland W. Bartlett, *The Milk Industry*, Ronald Press, 1946, p. 10.

of the consumer's dollar spent for butter was 29 cents and for American cheese, 45 cents (Table 1). For evaporated milk it was 59 cents. For market milk, the distribution share for home deliveries in 24 cities from 1929 to 1951 was 51 cents and for milk purchased at stores, 46 cents.³

Products which have a high specific value per pound, such as butter, usually have a relatively low distribution margin. In contrast, such products as evaporated milk, which have a low specified value per pound, have a relatively high distribution margin.

Analysis indicates that the proportion of the consumer's food dollar used for receiving, processing, packaging, transportation and distribution of foods tends to change inversely with changes in the general level of wholesale prices. Thus, in the deflation period from 1931 to 1940 the distribution share of the consumer's food dollar, as measured by the market basket margin, averaged 62 cents, or above the 1929-1951 average of 56 cents.

TABLE 2. COEFFICIENTS OF CORRELATION BETWEEN WHOLESALE PRICES AND MARKET MARGINS*

Years	Wholesale Prices and Market Basket Margins	Wholesale Prices and Dairy Product Margins
1913-1951	+.891	+.895
1920-1951	+.933	+.925
1936-1951	+.980	+.991

* Wholesale prices calculated from *Illinois Farm Economics*. Margins for market basket, dairy products, American cheese, butter, and evaporated milk from U. S. Bureau of Agricultural Economics. For margins of market milk, see Table 1, footnote a.

In contrast, from 1941 to 1950 the distribution share fell to 50 cents, or below the 1929-1951 average.

This situation, which is true for foods generally, also is true for the individual dairy products.

Further analysis indicates that distribution margins for foods tend to change directly with changes in the general price level. Following are coefficients of correlation between price and distribution margins computed for the period from 1913 to 1951 and for two shorter and more recent periods.

Since a perfect correlation is equal to 1.00, these data indicate the close relationship which has existed between wholesale prices and market basket margins and wholesale prices and dairy product margins, particularly in recent years.

Distributors' handling margins are more "sticky" than farm prices; they increase less than farm prices during periods of rising prices, and

* This is only a rough measure. See Table 4, footnote a.

they decrease less than farm prices during periods of declining prices.

The proportions of the consumer's food dollar used for distribution of market milk, evaporated milk, butter, and cheese tend to change in the same way as those for the family market basket, although the extent of the changes varies somewhat. For example, since World War II, cheese and butter margins have been relatively higher than the market basket margin, while margins for market milk and evaporated milk have been relatively lower. Increased margins for both cheese and butter in recent years have resulted, to a considerable degree, from increased costs of packaging of these products. Most butter sold to consumers is now packaged in cartons, each of which contains four quarter pounds. Cheese is also packaged in small lots to make it easily accessible to consumers. Ninety per cent of all chain stores and 53 per cent of the independent food stores now have self-service. Convenient packaging goes hand in hand with self-service.

TABLE 3. RETAIL STORE PRICE, WHOLESALE PRICE, PRICE TO FARMER, AND MANUFACTURING AND STORE MARGINS PER 14½-OUNCE CAN OF EVAPORATED MILK IN 48 MARKETS, 1919, 1929, 1939, AND 1951

Year	Store Price ^a	Wholesale Prices ^b	Price to Farmers ^b	Margins		
				Manufacturers ^c	Store ^d	Total ^e
1919	14.6	11.4	6.5	4.9	3.2	8.1
1929	10.1	7.7	4.1	3.6	2.4	6.0
1939	7.1	5.7	2.5	3.2	1.4	4.6
1951	14.5	12.6	7.2	5.4	1.9	7.3

^a From U. S. Bureau of Labor Statistics.

^b From USDA Bureau of Agricultural Economics.

^c Equals wholesale price minus price paid to farmer.

^d Equals store price minus wholesale price.

^e Equals store price minus price paid to farmer.

Margins for home-delivered market milk have risen less than those for other items because of the introduction of every-other-day delivery. Mass distribution of milk through stores in many cities has kept these margins lower than they would otherwise have been.

Margins for handling evaporated milk in stores in 1951 were only 59 per cent of 1919 margins (Table 3). This decrease in store margins, which was directly related to mass distribution of evaporated milk through chain stores, more than offsets an increase in manufacturers' margins in this same period.

Increasing Efficiency in Distribution of Dairy Products

Some basic changes are now taking place in the dairy industry. Among them are: (1) a decline in butter consumption; (2) an increase in the pro-

portion of milk used as market milk; (3) a rapid increase in the use of non-fat solids; (4) the increased competition offered to ice cream by frozen desserts made with vegetable fats; and (5) a widening of the areas to which milk is distributed from a bottling plant.

Most widely publicized change is the competition of vegetable fats with the butterfat used in ice cream. Concerning this change, the main problem of the dairy industry is to make sure that products using vegetable fat do not masquerade as butter or ice cream.

The real problem of the dairy industry, however, is to get its own house in order so that it can meet competition and continue to go ahead. Here are some specific suggestions for accomplishing this objective:

1. *Encourage the integration of plants manufacturing dairy products and those processing milk in order to lower unit costs of operation.*

The following quotation from an Iowa study concerns integration in creameries:⁴

"Many Iowa creameries have an annual production of less than 200,000 pounds of butter. In such creameries it is not unusual to have costs as high as eight to 10 cents per pound of butter. When it is considered that plants producing 350,000 pounds of butter annually can achieve costs less than five cents per pound, and plants producing 600,000 to 700,000 pounds can achieve costs less than four cents per pound, it becomes evident that the smaller creameries are in a very poor competitive position."

Economies of scale in specialized pasteurizing and bottling plants were pointed out in a Connecticut study which covered plants averaging up to 4,560 quarts a day. The report contained this further statement: "Evidence from other sources suggests that the decline in costs continues in volume ranges beyond that covered in this study, but it is impossible to project the economy of scale curve into these higher ranges without more detailed study."⁵

Limited observations made by the writer indicate that unit costs of

⁴ J. R. Fraser, V. H. Nielsen, and J. D. Nord, *The Cost of Manufacturing Butter*, Iowa Agricultural Experiment Station Research Bulletin 389, June, 1952, p. 789. Other bulletins of interest dealing with this same subject are:

E. F. Koller and O. B. Jesness, *Minnesota Cooperative Creameries*, Minnesota Agricultural Experiment Station Bulletin 333, 1937.

A. Mighell and P. E. Quintus, *Financial Management of Farmers' Creameries as Affected by Volume and Prices*, Iowa Agricultural Experiment Station Bulletin 351, 1936.

J. M. Tinley, T. H. Abbott, O. M. Reed and J. B. Schneider, *Creamery Operating Efficiency in California*, California Agricultural Experiment Station, Mimeographed Report 41, 1935.

⁵ W. F. Henry, R. G. Bressler, Jr. and G. E. Frick, *Efficiency of Milk Marketing in Connecticut. II, Economies of Scale of Specialized Pasteurizing and Bottling Plants*, Connecticut Agricultural Experiment Station Bulletin 259, 1948, p. 51.

milk plant operation tend to decrease with volumes up to 50,000 quarts daily.⁶ This is one reason which has made possible the large growth in intermarket shipments of milk from bottling plants which has been taking place in recent years.

2. Encourage the elimination of consumer price fixing in states which still have this form of control.

Primarily as a result of the depression between 1933 and 1940, 25 states and the federal government enacted legislation to fix prices which consumers should pay for milk. After only a few months of operation, in January, 1934, fixing of consumer prices by the federal government was abandoned. By the end of 1940, state laws had discontinued price fixing in Delaware, Maryland, Michigan, Ohio, South Dakota, Texas, Utah, and Washington. Between 1941 and 1950, price fixing was discontinued in Connecticut, Indiana, Massachusetts, New Jersey, and Wisconsin. Georgia was the most recent state to abolish consumer price fixing, its law being declared unconstitutional by the Georgia Supreme Court in November, 1951. To the present time, therefore, 14 of the 25 states which once had consumer price fixing have discontinued this type of control.

Governmental fixing of consumer prices has tended to curb the use of inventions and to legalize inefficiencies in the distribution of milk. Because this matter is covered at some length in my book, "The Milk Industry,"⁷ discussion here is limited to one example of the effect of such control.

During the past decade or so, repeated attempts have been made by at least one distribution agency selling milk to consumers in a chain of stores operating in California, Oregon, and Montana, to lower margins for milk sold through stores. These efforts have been disregarded by state control agencies, even though gross margins for handling milk in many cities in these states are far above those in other cities of comparable size in areas not under state control (Table 4). For example, in 12 out of 24 large cities in 1951, margins for distributing milk through stores were lower than those exacted under California law for milk sold in San Francisco. Margins in the 12 cities averaged 7.9 cents, or 1.1 cents a quart lower than those in San Francisco (9.0 cents). Furthermore, in the same year, margins in Washington and New York, two highly competitive markets, averaged 3.0 cents and 3.6 cents a quart, respectively, below those in San Francisco; while margins in the nearby city of Seattle, another competitive market, averaged nearly one cent a quart less.

⁶ R. W. Bartlett and F. T. Gothard, *Measuring the Efficiency of Milk Plant Operation*, Illinois Agricultural Experiment Station, Bulletin 560, November, 1952.

⁷ Pp. 81-87.

TABLE 4. COSTS OF DISTRIBUTING MILK TO CONSUMERS THROUGH STORES AS MEASURED BY DEALERS' GROSS HANDLING MARGINS IN 24 CITIES WITH POPULATIONS OF 300,000 OR OVER, 1929, 1939, 1949, AND 1951^a

City	Cents per Single Quart			
	1929	1939	1949	1951
Louisville	7.3	6.9	10.1	11.1
Chicago	7.6	5.1	10.2	11.0
New Orleans	7.3	4.7	9.6	10.1
St. Louis	7.2	4.9	9.4	9.7
Houston ^c	5.4	4.8	8.4	9.5
Indianapolis ^c	6.6	5.5	8.6	9.4
Detroit ^c	5.2	3.4	7.0	9.4
Cleveland ^c	3.8	4.5	8.0	9.4
Baltimore ^c	5.8	3.2	8.1	9.2
Pittsburgh ^b	6.5	6.5	9.4	9.1
Denver	6.5	5.4	8.1	9.1
San Francisco ^b	5.1	5.6	8.6	9.0
Rochester	6.4	6.2	8.0	8.9
Cincinnati ^c	8.2	4.9	9.4	8.8
Philadelphia ^b	5.4	4.8	7.4	8.7
Los Angeles ^b	6.2	3.0	8.5	8.7
Milwaukee ^c	3.8	5.7	7.4	8.6
Buffalo	5.9	5.8	7.4	8.5
Kansas City	4.7	6.7	7.3	8.5
Seattle ^c	4.4	5.0	7.7	8.1
Boston ^c	3.8	5.1	7.5	7.9
Minn.-St. Paul	4.9	6.1	6.1	6.5
Washington	5.1	3.7	5.0	6.0
New York	2.5	3.4	5.0	5.4
24-city Average	5.6	5.0	8.0	8.8

^a From USDA Fluid Milk Reports and Trade Association Reports. Included in this study were all cities which in 1940 had populations of 300,000 or over and for which data were available since 1929. Margins shown were computed on the basis of single-quart prices to consumers less cost of the milk. In each market where consumer prices are fixed (footnote b), the margin shown is that charged consumers. In many of the competitive markets, much of the milk is sold at quantity discounts with average margins materially below those received for single quarts. For example, in April 1952 about three-fifths of the milk in the Chicago market was sold in gallon and half-gallon containers at margins materially below that for the single quart. On a weighted basis, it was estimated that the average store margin was about one and one-half cents a quart below that for a single quart.

^b Markets where prices to consumers were fixed by state agencies in 1951.

^c Markets in states where consumer price fixing has been discontinued.

In view of the need for increased per capita sales of milk^a and the willingness of one or more distribution agencies to lower margins from one to two cents a quart below those now exacted, a question which may well be raised is: *Is it to the public interest of the people in San Francisco*

^a Various studies have shown that people drink more milk when prices and margins are reduced. Also, present sales of milk are far below the quart a day for children and the pint a day for adults recommended by nutritionists.

and the 10,600,000 people in California generally to continue to legalize inefficiencies of milk distribution in this state? And the same question may well be raised in each of the 10 other states which still fix consumer prices for milk.⁹

3. *Encourage intermarket shipments of milk, reduction of store prices at least two cents a quart below home-delivered prices in milk markets which now have no store differential, and wider use of quantity discounts.*

Hermann and Baill showed that in smaller cities the retail price of milk tended to be the same when bought in stores as when delivered to homes.¹⁰ This same tendency existed in April, 1952, when in 71 out of 128 markets included in the U. S. Department of Agriculture Fluid Milk Report the store price was the same as or higher than the home-delivered price. The 1950 population in the 57 cities which had a store differential averaged 590,500, compared with 133,200 for the 71 cities having no store differential. Prices for most of the smaller cities and villages in the United States are not included in this report.

Studies at Illinois indicate that the introduction of a sizeable store differential tends to increase per capita sales in both large and small cities. Between 1945 and 1949, each of eight smaller markets in Illinois, including Bloomington, Champaign-Urbana, Danville, Decatur, Peoria, Quad-Cities, Quincy and Springfield, lowered their store margins and store prices two cents and in some cases 2½ cents a quart.¹¹ In that period per capita sales in these markets increased 15 per cent; at the same time, those in the United States decreased 10 per cent. This increase in milk sales was directly associated with an increase in store sales resulting from the introduction of a store differential. Another contributing factor was the introduction of Grade A milk in these markets during the same period.

Quantity discounts and store differentials together have been associated with a sharp increase in per capita sales of milk. In 1950, per capita sales of milk in Chicago averaged .60 pint daily, or about three-fourths that of New York (.74 pint). By 1950, per capita sales of milk in Chicago had increased to .77 pint daily, or only four per cent below those of New York (.80 pint).

From 1896 to 1930, store prices in Chicago were the same as home-delivered prices. During at least part of this period, consumers in New

⁹ The 11 states which still have consumer price fixing are Maine, New Hampshire, Rhode Island, and Vermont in New England; Alabama, Florida, and Virginia in the South; California, Montana, and Oregon in the West; and Pennsylvania in the Middle Atlantic area.

¹⁰ Louis F. Hermann and Mordecai Baill, *Farm-to-Retail Margins for Fluid Milk*, U. S. Department of Agriculture, BAE, November, 1951, p. 20.

¹¹ *Illinois Farm Economics*, April 1952, p. 1340-1347.

York could buy milk at stores at four to five cents a quart below the home-delivered price. In 1930, only six per cent of the milk sold to consumers in Chicago was purchased at stores.

Between 1930 and 1940, the controls which had prevented low-priced store milk in Chicago were broken. It is reported that the dairy chiefly responsible for breaking these controls was owned by Al Capone.¹² Since 1940 there has been plenty of competition in Chicago, with the result that milk in large-sized containers is now a bargain. In April 1952, the store price for milk in gallon jugs ranged from 69 cents to 82 cents, 78 cents being about the average. At 78 cents a gallon, or 19.5 cents a quart, Grade A milk in Chicago was only 39 per cent higher than the 1929 store price, while at the same time prices for all foods in Chicago were 79 per cent higher.¹³

The key to lower margins, both in Chicago and in the smaller down-state markets, has been the keen store competition. Store sales now account for around 70 per cent of the total sales of milk to consumers in both New York and Chicago. In a smaller market such as Champaign-Urbana (64,000), store sales increased from 18 per cent of total sales in 1945 to over 50 per cent in 1950.

For the country as a whole, home deliveries still account for around 55 per cent of total milk sales. While apparently it is neither possible nor desirable to stem the trend toward a greater proportion of store sales, those interested in preserving the home-delivery system have helped to do so in competitive markets through use of home-delivery quantity discounts, advertising, and special services to consumers. In the writer's opinion, it is likely that from 20 to 40 per cent of the consumers in the United States will continue to want home-delivery service and be willing to pay for it.

¹² Federal Trade Commission Report: Chicago Sales Area House, Document 451 (1936) p. 18.

¹³ All dealers in Chicago pay the same price for Class I milk. Hence reduction in consumer prices is made by reducing the handling margin.

CURRENT PROBLEMS IN AGRICULTURAL FINANCE

Chairman: Harold Hedges, Farm Credit Administration

FINANCING YOUNG FARMERS

ERNEST T. BAUGHMAN
Federal Reserve Bank of Chicago

A GOAL of long standing for American agriculture has been the achievement and perpetuation of a large proportion of owner-operated farms. Realization of this goal is dependent in large part upon the successful periodic transfer of the ownership of agricultural resources to new and younger farm operators. However, the financing of beginning farmers is not primarily that of arranging for the transfer of complete "going" farm units. Although such transfers are in many respects commendable, the problem is much broader and more varied.

Many, if not most, young farmers do not take over going farm units. Similarly, most retiring farm operators do not dispose of their real estate, machinery, and livestock in single package deals. Rather, farm businesses tend to go through cycles of expanding and contracting production and efficiency, reflecting changes in the energy, ability, labor, and capital resources of the farm owner and operator. The declining phase of these cycles usually occurs in years preceding the transfer of farm ownership and may continue for several years thereafter until the new owner has acquired adequate knowledge and capital for the optimum operation. Much interest, therefore, centers on the possibility of developing arrangements for the transfer of management and owner interests in farm businesses in a manner planned to avoid the loss of efficiency which frequently is associated with changes in ownership.

The subject attracts interest also as a result of the continuing trend toward fewer and larger farms, the rapid growth in capital per farm worker, the high level of prices (including the perennially associated expectation that "prices may decline within a year or so") and the accumulation on farms in the war and early post-war years of a large number of aged operators.¹ As mechanization becomes more complete, and new technological developments add to the amount of specialized machines and equipment on farms, the non-real estate capital per farm worker appears certain to increase further. Thus, to acquire debt-free ownership of an

¹ Some of this backlog of potential farm transfers has been worked off. According to the Census of Agriculture, the average age of farm operators in Iowa, for example, declined from 47.2 years in 1945 to 46 years in 1950. This is not typical of all states, however.

economic farm unit, it may be necessary for each succeeding owner to accumulate more capital—both real estate and non-real estate—than was required by his predecessor. The problem may become more rather than less important in the years ahead.

The Problem

Beginning farmers typically have only a nominal amount of financial resources. The major assets they bring to a potential farming operation are labor, including management ability, and a knowledge of farming. Financial arrangements, therefore, must be adapted to these conditions. The problem is to merge the labor resource of the new farmer with the amounts of land and capital which will result in a productive combination, and in a manner which will provide an acceptable distribution of the resulting income.

This could be achieved by providing loans to beginning farmers for the full purchase price of agricultural resources. However, this type of credit is not generally available, and, considering the large measure of price uncertainty in agriculture, probably cannot be justified as a standard practice.² Most new farmers, therefore, could not finance the outright purchase of a going farm unit of economic size, even if they were willing to incur the necessary debt to do so.

Accumulation of capital by working as a hired farm hand appears to be falling into disfavor, although farm wage rates have risen relatively higher than prices of most agricultural resources since 1940. The large amount of capital required to farm and the many opportunities to spend rather than save wage income appear to be largely responsible. In a recent Minnesota study it is reported, for example, that savings from wages earned on either farm or non-farm jobs were considered by beginning farmers as unimportant sources of capital.³ The emphasis appears to have shifted, therefore, to *getting started* and subsequently accumulating capital primarily from the farming activity.

The question of when to start naturally focuses attention on the current level of economic activity and its future prospects. This merits consideration. But inability to judge the future course of economic events with an acceptable degree of accuracy indicates that the status of the prospective beginning farmer probably should be the controlling factor in this decision. If he has reached the point where he is ready to start farm-

² Loans offered by the Farmers Home Administration approximate these terms but are available only in limited amounts and to a limited number of borrowers. If generally available, such credit might substantially increase the demand for agricultural resources and have important effects on their prices.

³ *Starting Farming in Southeastern Minnesota*, University of Minnesota Agricultural Experiment Station Bulletin No. 405, June, 1950.

ing and has an acceptable opportunity, he generally should make the move rather than wait for a time when economic prospects appear more favorable.

Financial Arrangements

A farm which will provide productive full-time employment for a family represents a large accumulation of capital.⁴ The average value of land and buildings in Iowa farms as reported in the 1950 Census of Agriculture was \$27,566. The average size of farms was only 169 acres. The value of physical non-real estate assets on U.S. farms has averaged more than 50 per cent of the value of real estate in recent years.⁵ For many Midwest livestock farms, the non-real estate capital would be an even more important part of the total. Furthermore, current values are higher than those indicated here due to price advances and additions to the amount of machinery and equipment on farms since 1950.

Since the new farmer typically has little capital, it must be provided either by creditors or owners. The former requires that both lender and borrower accept large measures of risk but permits rapid financial progress when the farm operation receives exceptional management and experiences no unusual hazards. The latter keeps risks and equities in better balance but commonly results in a slower rate of financial progress for the capable young farmer. Appropriate financial arrangements for beginning farmers, therefore, usually will emphasize: (1) the labor input; (2) using credit for only the most essential needs; (3) low risk production, frequently even at the expense of some reduction in income; (4) production for sale and of relatively quick turning items; and (5) a large enough volume of production to permit an effective use of labor and a margin of income for debt service and saving. These considerations may be combined in a number of ways, depending on the circumstances surrounding each case.

Ways to Start

The way a beginning farmer gets started will be determined largely by the amount of capital available to him and the farm opportunities that happen to open up within the acceptable area and time span. He may acquire a complete "going" farm by outright purchase. This, of course, requires a volume of financial resources not common to most young farmers. Even when such resources are available, however, it frequently

⁴ *Capital Needed to Farm in the Midwest*, North Central Regional Publication No. 5, University of Minnesota Agricultural Experiment Station Bulletin No. 389 provides useful information on capital requirements for selected types of farms at 1945 prices.

⁵ "The Balance Sheet of Agriculture," *Federal Reserve Bulletin*, Board of Governors, Federal Reserve System, July, 1952.

may be preferable to start by renting.⁶ He may inherit a farm although for many this obviously is not within the realm of possibility. Furthermore, the time of transfer may not coincide with the time that the young farmer wants to start farming.

Probably the most typical "beginning farmer" is a farmer's son who has grown up on a farm in the area, attended high school and possibly had some agricultural courses, worked for a time either on a farm or in other employment, has accumulated an automobile and a very nominal amount of savings either in the form of liquid financial assets, livestock, or machinery, and now wishes to start farming for himself. His background and standing in the community make him an acceptable moral risk to agricultural lenders. Major difficulties are the large capital requirements and his limited assets. In many communities, he also will have difficulty locating an acceptable farm. Assistance may be available to him in the form of free use of important items of equipment owned by parents, other relatives, or friends; endorsement of notes providing ready access to a limited amount of credit; and some gifts.

Young men in these or similar circumstances frequently are tempted to purchase small or run-down farms and start as owner operators. This usually does not provide for the best use of their resources. When a farmer has access to too little capital to meet all his needs, it usually is good practice for him to rent rather than own. This permits operation on a scale which makes more effective use of his labor and usually results in more rapid financial progress than small scale operation as an owner.

When renting a farm, beginning farmers are especially concerned with the relative capital requirements of the various types of leases and their differences in exposure to risks. Cash leases involve relatively more risk and usually should be avoided until the farmer owns most of his operating equipment and livestock clear of debt. Share leases divide the risk of crop losses between landlord and tenant. Many such leases also divide a part of the expenses of producing the shared crops. These are advantages for beginning farmers. Stock share leases usually require larger amounts of capital from the tenant in that they require ownership of a part of the productive livestock. Their major attraction to beginning farmers is that a tenant with very nominal assets frequently can buy into a stock share set-up merely by giving a note to the landlord for the tenant's interest in the business. Share cropping, a common form of tenure in some areas, resembles crop share renting, but with the cropper contributing little except his own labor to the enterprise.

Many aspiring farmers do not have financial aid available to them

⁶ Carl C. Malone, *How to Make Your Farm Pay*, Iowa State College Press, 1950, p. 108.

from within the family. Their one major asset is their labor and knowledge of farming. Such persons need not only real estate but all operating capital as well. Their best initial opportunity probably lies in an arrangement with the owner of an equipped farm where they will receive a share either of the gross or net farm income (usually in addition to a base wage) in return for their labor and management. These arrangements are most common between family members but need not be limited to such relationships. While usually starting as a wage or income-sharing agreement, they can readily develop into full partnerships or lease arrangements as the young farmer accumulates capital and management experience.

Widespread interest in father-son farm operating agreements has developed in recent years.⁷ These usually involve a three-fold objective (1) to aid a son get started farming, (2) to avoid "running down" farms during the declining years of an operator, and (3) to simplify the transfer of ownership from one operator to another at a subsequent date.⁸ Popular use of such arrangements is limited because many farms are too small to support more than one family; it is difficult to maintain active interest of both father and son in the farm business and amiable relationships between their families; and problems of arranging for succession when there are several children in the family.

The first difficulty will not be serious in most circumstances when there is a keen interest in developing such an agreement and the father has substantial equity in the farm assets. Farms can be enlarged by renting or purchasing additional acreage, and frequently by making substantial capital investment either in soil improvements or livestock or both. These steps, of course, require additional capital and frequently involve the use of credit. The problem of maintaining interest and amiable relationships is both economic and personal. A primary economic consideration is to provide for the transfer of an increasing amount of responsibility and a larger share of the income to the son as he accumulates capital and knowledge. A generally accepted suggestion with respect to personal relationships is that separate housing for each family is practically essential.

An important advantage of such agreements is their flexibility. They vary from simple wage agreements, which may or may not include a bonus in the form of a percentage of the net farm income, to enterprise agreements involving a share of the receipts from one or more of the farm

⁷ The subject is discussed in publications issued by the U. S. Department of Agriculture, by Michigan State College (for the North Central Land Tenure Research Committee), and by several other land-grant institutions.

⁸ This is not a necessary part of such agreements and should be considered separately from the operating arrangement.

enterprises, to full partnerships. Many of them go through several stages of development as the circumstances change.

Father-son farming agreements need not be for long terms. This is especially true in families where there are several children. They have been used satisfactorily as a means of providing aid to succeeding sons in the accumulation of capital necessary to move out on their own as farm operators on rented or purchased land.

Adequate Credit Facilities

In appraising the adequacy of credit facilities for agriculture or other types of activity, it is hard to distinguish between difficulties resulting from credit stringency and from other causes. Business reverses characteristically show up as inadequacies of working capital. This focuses attention on the availability and terms of credit, regardless of whether that is the major factor in the situation.

As long as some of those who desire to start farming are unable to work out the necessary arrangements credit facilities will appear to be inadequate. The limited number of good opportunities for beginning farmers will not be changed significantly, however, by modifying credit facilities or practices. A process of selection, therefore, will continue to be an integral part of financial arrangements for new farmers, and with some failing to be accommodated.

Excessively liberal credit arrangements can work to the disadvantage of beginning farmers. It could encourage them to assume risks too great for their assets and managerial ability. More important, however, if used broadly, it would tend to boost prices of agricultural resources, thereby increasing capital requirements for beginning farmers and probably minimizing their possibilities of success.

Credit facilities and practices, of course, should be adapted insofar as possible to accommodate the needs of new farmers. This is essential if most farm land is to be owned by those operating it. It applies also to the non-real estate capital used in agriculture. A number of areas merit increased attention by both lenders, borrowers and researchers.

The growing non-real estate requirements for agriculture emphasize further the need for intermediate, as compared with strictly short-term, credit. This is true for many well established farmers as well as for those just getting started.

Leasing arrangements have important credit implications and merit further careful study.

Use of large amounts of credit to obtain balanced combinations of labor, land, and operating capital focuses attention on *production* as security for loans. In this connection, both borrowers and lenders may find

it to their advantage to invest additional time and effort in carefully planning both production and financing programs. A related factor is the increased need for close supervision of credit, preferably by agricultural specialists as the basis of security for loans is shifted.

With growing mechanization and other technological developments, adequate scale of operation may become even more important. Lenders and borrowers alike, therefore, should emphasize that the farm units financed be of adequate size to permit earning an income which will provide a margin for debt service and saving.

The conditions which have attracted passing interest to "corporate-like" arrangements for providing farm capital owned by several people but operated under a single management, continue, as a part of the agricultural scene and suggest that this idea merits further study.

PROBLEMS OF NORMAL VALUE WITH RISING PRICES

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FARM appraisals may be made for a number of purposes and are the concern of varied groups of people. Prospective buyers and sellers of farms, lenders of funds on the security of farm real estate, those concerned with the settlement of estates, referees in cases of eminent domain, and tax assessors are among those vitally concerned.

Appraisals Based on Normal Values

Prospective purchasers of farms and lenders of funds on the security of farm real estate are the groups perhaps most concerned with appraisals based upon normal value as opposed to current market value. These groups are interested primarily in normal value because this is a reflection of long-term earning capacity. It is this capacity which pays for a farm over the years, and which returns the principal and interest on loans in regular installments. Prior to the last two decades, lenders in general failed to recognize this.

The Farm Credit Administration, accepting its mandate from Congress, exercised sound leadership during the early 1930's by applying the idea of normal agricultural value, with its well-known definition: "The amount a typical purchaser would, under usual conditions, be willing to pay and be justified in paying for the property for customary agricultural uses, including farm home advantages, with the expectation of receiving normal net earnings from the farm." Many other institutional lenders adopted this theory of normal agricultural value with only minor variations.¹

This normal agricultural value is based upon many factors, but the long-term earning capacity of the farm is a major consideration. In arriving at normal agricultural value, a typical cropping system is set up and average yields in the hands of a typical operator are assumed. Normal prices and costs are then applied in determining the expected normal net income.

From that point, valuation consists basically of a capitalization of expected normal net income. The basic formula for this determination is as follows:

$$\text{Value (v)} = \frac{\text{(a) Expected annual net income}}{\text{(r) Expected rate of interest}}$$

¹For example, see, *Appraising Farms for Loans*, the Equitable Life Assurance Society of the United States, Farm Loan Service, New York 1, New York.

Thus, assuming an expected annual net income of \$1,000, and an interest rate of five per cent, the capitalized value would be \$20,000.

$$V = \frac{\$1,000}{.05} = \$20,000$$

It is to be noted that the value is changed by changing either the expected annual net income or the expected annual interest rate. For example, by increasing the expected annual net income to \$1,250 the value is changed as follows:

$$V = \frac{\$1,250}{.05} = \$25,000$$

Or, by leaving the expected annual income at \$1,000 and lowering the interest rate to four per cent the same result is obtained.

$$V = \frac{\$1,000}{.04} = \$25,000$$

Thus, a policy of lowering interest rates or of holding them down below their normal levels can have inflationary effects on land values and create problems of normal value which are in every way similar to those which are to be encountered because of rising commodity prices.

The relationships between farm income, land earnings, and land values, are discussed in the regular issues of the *Farm Real Estate Situation*, published by the Bureau of Agricultural Economics. The analyses in these reports indicate that, although these relationships are positive, trends in land values tend to follow, rather than to respond immediately, to changes in farm income.² During World War I, farm income increased more rapidly and reached higher levels relative to the pre-war period than did land values. From 1910-14 to 1919, gross farm income increased 136 per cent while land values increased 75 per cent. This was an increase of 0.55 per cent in land value for each increase of 1.00 per cent in gross farm income.

Between 1935-39 and 1951, gross farm income increased about 216 per cent, while land values increased 113 per cent. This was an increase of about 0.52 per cent in the estimated value of farm real estate for each increase of 1.00 per cent in gross farm income.

There was similarly an increase of 0.57 per cent in the estimated value of farm real estate for each 1.00 per cent increase in the price of farm commodities during World War I, while during the World War II period the increase was approximately 0.63 per cent.

The influence of commodity prices on profits in farming, and thus on

² W. H. Scofield, and R. D. Davidson, *The Farm Real Estate Situation*, 1947-48 and 1948-49, Bureau of Agricultural Economics, Circular No. 823, September 1949.

land value, is portrayed by a study of citrus costs and returns in Florida.³ During the 19-year period, 1931-1950, net returns above operating costs for over 200 groves over 10 years of age fluctuated from an annual average of \$-21.97 per acre in 1947-48 to \$425.07 in 1943-44. This was the net return before any charge was made for interest on grove valuation or for owner's labor and supervision.

It should be apparent that there is little merit in assuming the current earning power of a farm to be the true or normal earning power. It is for this reason that normal prices and costs should be used in arriving at normal earning power before applying the capitalization process.

It is to be assumed that in the future, land values will continue to go up and down, sometimes much too high and at other times much too low. It is to be assumed further that these fluctuations will continue to be associated with fluctuations in the prices of farm commodities and farm income. Normal values are an effort to average out peaks and valleys caused by fluctuation of the price cycle.

The problems faced by the lender in trying to hold to the normal value concept during a period of rapidly changing farm prices are numerous and real. Some of these problems will now be examined in the light of this background.

Problems Faced By Lender

1. Differences in Productivity of Land.

It is generally recognized that appraisals tend to cluster about an average and that valuations do not reflect, completely, differences in productivity and earning power of farms. Some people have been so unkind as to state that even among experienced appraisers, good land tends to be undervalued and poor land to be overvalued. During periods of rapidly rising farm commodity prices, the difficulty of reflecting differences in the productivity of land is increased; all grades of land show excess value, and normally sub-marginal land shows some value.

It is to be remembered that *normal* agricultural value is not only a reflection of *normal* prices and *normal* costs, but also of *normal* yields, and a *normal* or *typical* cropping system in the hands of a *typical* operator. When prices are rising rapidly and farmers are prospering generally, the cropping system appears better and yields are likely to be better, thus complicating the task of the appraiser in attempting to hold the line.

During such periods, yields may appear to be higher in relation to more normal price periods than they actually are, since the entire produc-

³Zach Savage, *Nineteen Years of Citrus Costs and Returns in Florida, 1931-1950*, Agricultural Extension Service, University of Florida, AE Series No. 52-3, March, 1952.

tion is harvested. The previously mentioned study of Florida citrus groves well illustrates this point. From 1931-1936, an annual average of 126 boxes of fruit were harvested per acre. From 1936-1941, the average was 175 boxes, while from 1941-1946 it was 250 boxes per acre. From 1946-1950, the annual average was 302 boxes per acre. A part of this increase during the war years was due to increased production, but a substantial part was due to higher prices.

2. Demand for Farm Land As a Hedge Against Inflation.

When the general level of prices is rising, prices of farm commodities rise faster than production costs, resulting in better than average net earnings. At the beginning of this rising trend, farm real estate values are slow to respond. With continuing inflation, however, part of the increased net earnings are capitalized into land values. Part of the increased earnings go into increased farm wages, and the farmer increases his own standard of living. As the inflationary period progresses, more confidence develops as to its permanence and the increase due to the capitalization process is accelerated. Then demand for farm lands by small to moderate investors as a hedge against inflation manifests itself, and land values rise faster and faster. It can also be said that the problem of the appraiser in holding his appraisals to a long-term normal value basis becomes more and more difficult as this trend continues.

3. Pressure on Appraisers for More Liberal Appraisals.

During this inflationary spiral, the lender is under constant pressure to make larger and larger loans. This, of course, can be done in either of two ways, i.e., (1) lending larger percentages of normal value appraisals, or (2) raising appraised values to higher levels.

Since most of the large institutional lenders are committed to a policy of using a fixed percentage of normal agricultural value as a ceiling on the size of the loan, and since this is a factor which can easily be controlled, pressure is directed to the appraiser to be more liberal in his appraisals. Then the human element in normal value appraisals meets its greatest test. Regardless of the training and of the previous experience of the appraiser, he finds it increasingly difficult to hold the line and adhere to what many people conscientiously believe to be an obsolete standard of normal values.

As a result of this test of human frailty and of these honest differences of opinion, the problem of standardization of appraisals is magnified. Appraisers with an optimistic view of the future may make consistently higher appraisals than the pessimists. This is more likely to be true of appraisers of differing outlook serving different lending institutions than of appraisers serving the same institution, since in the latter case standard price and cost tables and adequate reviews tend to hold appraisers more

or less in line. As among appraisers serving different lending institutions, these controls do not exist.

4. *The Competitive Situation.*

Under these circumstances, it is not surprising that the less scientific lenders and those who are more willing to ride with the times increase their proportion of the total volume of new loans. Lenders who adhere strictly to a normal value basis of appraisals find their loan volumes drying up. A number of illustrations, furnished by a leading lender in Florida in such manner as not to reveal the identity of the applicants, may serve to point up what has been happening recently.

An application submitted by a poultry producer called for a loan of \$25,000 to be used for refinancing a \$15,000 mortgage and for making various improvements. The appraiser's report showed a current market value of \$55,000, but the normal agricultural value was only \$22,500. Applying a fixed ceiling of 65 per cent of normal agricultural value, (the legal ceiling of the federal land banks) the maximum amount that could be offered was \$14,600, not quite enough to refinance the existing mortgage, not to mention the desired improvements.

An application from a tobacco grower was for \$6,500. The present market value of this property was \$20,000 while the normal agricultural value was \$7,000. This indicated a maximum loanable of \$4,500, only about two-thirds the amount required.

The owner of a citrus grove with an appraised present market value of \$57,000, submitted an application for \$16,000 to refinance existing indebtedness and for other purposes. The normal agricultural value of this property was \$23,175, with a maximum loanable of \$15,000.

An application was submitted by the owner of a cattle ranch for \$20,000 to refinance a real estate mortgage. Present market value of this property was \$60,000 and the normal agricultural value was \$21,000. The maximum loanable in this case was \$13,600. This amount was unacceptable and subsequent investigation revealed that a competitor made this loan, not for \$20,000 as originally requested, but for \$26,000.

This last case illustrates a very serious problem in the matter of normal value appraisals tied in with a fixed percentage of this value as a loanable maximum. The experience of the 1930's demonstrated what could happen with an accumulation of loans based on current market value appraisals. Unfortunately, loans made on this basis are more likely to be made by the weaker, less scientific lenders. These are the lenders who are less willing and less able to go along with the borrower in case of difficulty. A trend in the direction of loans of this category could have dark forebodings for the future should there be even a moderate repetition of the price-cost-value relationships of the 1930's.

Discussion

Institutional lenders then are faced with the two horns of a dilemma: Shall they hold tight to the normal value basis of appraisal and lose loan volume to competitors who may be weaker and less able to deal with the situation in case of depression conditions, or shall they "relax just a little" and go along with the tide to the extent necessary to retain their competitive position.

Principal argument in favor of the latter course is that the "normal" prices used in normal value appraisals are too low. This may or may not be true. Originally the tables of normal prices used by most lending institutions were based on 1910-1914 prices. This base was later changed in many cases to 1935-1939 prices, or to 1936-1940. Certainly constant study of normal prices is necessary and the lender should be alert to modernize this normal value base at the earliest moment that this can be done on a sound basis.

The Equitable Life Assurance Society of the United States has undertaken to lighten the burden of this decision by the introduction of what it terms "interim normal" prices and costs. Of this step, the Society states: "By fall 1950, pre-war prices and cost levels appeared to have become obsolete as a basis for establishing normals. While minor adjustments in prices and costs had been made in appraisal work from time to time, and there had been a gradual but spotted adjustment upward in appraised values, the time seemed to have arrived to depart from the 1935-39 level as a base. It became evident that a generally higher agricultural price level would prevail for a number of years and that its effect upon land values needed to be re-examined. Accordingly, the policy changes outlined in this supplement were put into effect on October 1, 1950."⁴

As a result of these policy changes, the Society adopted a schedule of "interim normal" prices and authorized benchmark appraisals based on the assumption that the adopted levels of commodity prices and costs are reasonably assured to 1955 or 1956, but may drop materially after that date. The Society states further that: "These 'interim normal prices' do not exactly meet the requirements of the definition of normal prices as the average 'prices anticipated for a period of years ahead.' They rather represent floors below which prices are not expected to go for an extended period. They are prices which appear safely assured for investors in farm lands and in farm mortgages for the years immediately ahead, *with the understanding that full loans based on values as provided for herein and on the suggested higher price level will be reduced to more conservative*

⁴ R. I. Nowell, *Appraising Farms for Loans*, Supplement No. 1, the Equitable Life Assurance Society of the United States, New York 1, N.Y.

amounts by faster than average amortization in the early years." (Italics ours.)

In attempting finally to resolve the dilemma, and giving consideration to the other alternative mentioned, we are reminded and would like to make a modern application of the words of Dean W. I. Myers while he was governor of the Farm Credit Administration: "In times of low prices and depressions, lend courageously; in times of high prices, high costs, and inflationary periods, lend with care and caution."

It took considerable courage to lend on normal values during the depression of the thirties. Normal value during depression is the same as normal value during inflation, but normal value during the depression of the thirties was relatively high and in some cases higher than market value. Sticking to normal value during the present times when in so many instances the normal value is far below the market price perhaps takes more courage than during the depression.

Normal value needs to be re-examined currently, and this re-examination needs to be a constant and continuing process. But when the best information available is utilized in the construction of normal price and cost tables, and when practical measures can be used in applying these tables, lenders who have taken upon themselves the responsibilities of leadership in the field of farm credit should be prepared to continue on the "normal value" basis with full faith that their steadfastness will be justified.

FINANCING LOW INCOME FARMERS IN PUERTO RICO

RAMÓN COLÓN-TORRES

*Secretary, Department of Agriculture & Commerce
Commonwealth of Puerto Rico*

LACK of adequate credit facilities is one of the main problems in Puerto Rican agriculture. Until 1934, our farmers depended almost entirely on the credit facilities offered to them by local merchants or by sugar mills. Interest rates were very high, at times even in excess of 30 per cent a year. During the past 20 years, however, the farm credit situation has improved considerably, but by no means enough to contribute its full share to the development of Puerto Rico's agriculture.

According to the 1950 census, there are 104,669 farms in Puerto Rico, of which 89,623 are less than 20 acres in size. On the other hand, information obtained from all credit agencies in Puerto Rico, including private banks, indicates that during 1949-1950 production credit was made available to only 15,900 different farmers. In addition, it is estimated that another 15,000 farmers financed themselves or had access to some credit from merchants and other types of lenders. Another 60,000 farm operators had to finance themselves in some way or get along without in developing their agricultural activities.

Need About 100 Million Dollars Annually

On the basis of known production factors, agricultural income, and actual credit facilities provided by the different agencies, a conservative estimate indicates that around 100 million dollars are needed yearly to finance current agricultural production in Puerto Rico. Developmental programs already formulated, aimed at a more balanced and intensive utilization of the agricultural resources of the Commonwealth, call for a much higher figure for production credit.

Of this amount, farm credit organizations such as Farmers' Home Administration and P.C.A., as well as private banks, provide approximately 44 million dollars a year. Of the remaining 56 million dollars, a very small amount is provided by merchants and other lenders at high interest rates.

The situation is still much more serious in view of the fact that 95 per cent of the credit facilities are limited to three crops, namely, sugar cane, coffee, and tobacco. Even among these three main enterprises, sugar cane is the only one for which adequate credit facilities are available. Most of the commercial banks have practically limited their agricultural loans to sugar cane farmers. This same restriction holds true for several of the government sponsored agencies, including P.C.A. Coffee growers, for example, have access to loans at reasonable interest rates covering only 36

per cent of their actual needs. Tobacco farmers have access to loans for only 25 per cent of their actual needs.

Credit for food crop production other than sugar is almost unavailable. In the year 1950-51, the estimated farm value of foods produced, including dairy products and fruits, but not including sugar, amounted to 89 million dollars. This is approximately 41 per cent of the total value of agricultural products in Puerto Rico. On the basis of these figures, it is estimated that 40 million dollars in credit are needed for such food production. However, credit available to cover this need has been insignificant if not lacking altogether. In the dairy industry, for example, not more than 50 farmers have access to funds to fully meet their credit needs. The only type of financing generally available for this enterprise is store credit on feeds. In the case of vegetables and other food crops, it has been almost impossible to obtain production credit from the credit agencies mentioned above.

In spite of the great possibilities which exist in Puerto Rico in the field of food production, there has been reluctance on the part of commercial banks, and government agencies as well, to provide means for the development of those possibilities. This reluctance, in the case of public agencies, is probably due to a lack of understanding of the important role of credit in agricultural development.

Previously existing agencies, such as the Emergency Crop and Feed Loan Office and the Farm Security Administration, both later merged into the Farmers' Home Administration, could have made much more valuable and practical contributions to the development of farm credit. A similar indictment can be made in regard to this latter agency and to the Production Credit Association. Contrary to what happened with these same agencies in the States, in Puerto Rico they were and still are exceedingly conservative and appear to be too deeply concerned with the presentation of good records of annual repayments of loans. This concern has led them to adopt standards which have placed them in the same category as the private credit institutions. There is too great a tendency to make loans only for the financing of sugar cane, coffee or tobacco production or to serve in this connection only relatively large farmers. Such a policy eliminates over four-fifths of all farms in Puerto Rico from the use of the credit facilities of these agencies.

Special Measures Needed to Boost Production

In Puerto Rico, as in other underdeveloped areas, characterized by a highly specialized economy, limited natural resources and a great prevalence of small size farms, there is a great need for special measures which will help to bring about necessary adjustments in agriculture and lead to

efficient abundant production. In areas such as ours, new imaginative schemes are indispensable to eliminate economic maladjustments and scarcity. Subsidized and highly supervised organizations must be created, and active participation of farmers developed in order to insure the continued successful operation of the programs on a self-sustaining basis.

The Department of Agriculture of Puerto Rico, deeply concerned with this situation, is developing a farm-credit system which includes these five major phases:

- (1) Cash loans to needy farmers.
- (2) Loans in kind to farmers who do not qualify for cash loans.
- (3) A system of insured credit.
- (4) A system of crop insurance.
- (5) Improvement of the marketing structure.

As a corollary to this program and in order to assure its success, the Department of Agriculture, aided by other agricultural agencies, is promoting the direct participation of farmers through the organization of cooperative associations. Fundamental objective is to develop all the activities involved in this program through the organization of cooperatives which will be managed by the farmers themselves.

Cooperative associations are to play a most important role in the development of any program for increased agricultural production. The fact that over four-fifths of our farms are less than 20 acres in size, makes it almost impossible for farmers to provide for themselves, on an individual basis, the necessary facilities for the production and marketing of their crops. Effectiveness of cooperative societies in dealing with this problem has been amply demonstrated by the success attained by the coffee, tobacco, and sugar cane associations now operating in the Commonwealth.

One of the most important activities of cooperatives should be to provide loans to members at reasonable interest rates. Such credit may be offered in the form of supplies for production or in cash. Farmers, in turn, will market their crops through their cooperative associations. Thus, cooperatives would serve as agencies for the integration of production and marketing services.

For the development of the program sponsored by the Department of Agriculture, two organizations of great importance have already been created. These are:

- (1) The Food Production and Distribution Program.
- (2) The Puerto Rico Bank for Cooperatives.

The Food Production and Distribution Program extends credit to cooperatives in the form of seeds, fertilizers, equipment, insecticides, and other necessary supplies. These supplies are provided at cost. The coopera-

tives, in turn, sell these supplies on credit to their farmer members. The program, in addition, helps in the marketing of the products received by the cooperatives from their members. This help includes education as to proper grading and packaging, official inspection of the products when required by buyers and orientation on and contracts with existing and potential market outlets. Through these services, two of the most important problems hindering food production are being tackled by this program—the credit problem and the marketing problem.

The Puerto Rico Bank for Cooperatives is one of the agencies which provides the necessary credit in cash for cooperative associations. The Bank is authorized by law to make loans to cooperative associations in order that they be able to make production loans to their members. The Bank also is authorized to make commodity loans, and loans for the purchase of equipment for operating capital and for real estate.

It is our objective to extend the operations of the Puerto Rico Bank for Cooperatives so that it may make direct loans to farmers and insure loans made by farmers and cooperative associations from private banks. The insured credit program undoubtedly will increase the interest of private banks in farm loans and make possible the expansion of the activities of the Puerto Rico Branch of the Baltimore Bank for Cooperatives.

Another of our important objectives for improving farm credit facilities is crop insurance. At present, our crop insurance program is limited to coffee. We are planning to extend this program to other crops such as tobacco, bananas, plantains, and pineapples. Such an insurance program will open new sources of credit to Puerto Rican farmers.

We further realize that no credit system, with the broad objectives here outlined, would work successfully unless accompanied by an efficient well-rounded marketing set-up. For this reason, we have given first priority in our developmental programs to the establishment of such a set-up. Adequate new marketing facilities are being provided at both distribution centers and country points. All sorts of marketing services to both farmers and the trade also are being furnished. These improvements in the market structure will reduce credit risks and thereby stimulate the expansion of credit facilities on a sounder basis.

Conclusion

The program sketched out in these short notes is, in our opinion, at least part of the answer to the farm credit problem in areas having similar conditions to those of the Commonwealth of Puerto Rico. To those who see such programs as an undesirable extension of government control, it should be pointed out that in economically advanced countries, special consideration by governments for cooperatives has been an acceptable

principle for some time. We think that the participation of government in the solution of such problems is essential. It is a responsibility of government to serve as pace-setter and give the initial push necessary to set the ball rolling. It also is essential for the government to recognize that in the long run this should be a people's program. With this end in view, it will be necessary to develop the mind and attitudes of the farmers themselves toward the principles of mutual aid and self-help, in order that they will finally take charge of and develop further their own credit institutions.

This is a program that calls for the effective combination of two forces: The government through its credit and educational institutions, and the farmers through their voluntarily organized cooperative associations. Government, on the one hand, providing the necessary educational and financial assistance; and the organized farmers, on the other hand, running efficiently managed cooperatives, can do much towards the solution of the enormous credit problem in underdeveloped countries. Working together they can do away with scarcity.

COOPERATIVE CREDIT

Chairman: Aubrey Brown, University of Kentucky

SOME ASPECTS OF THE FINANCING OF FARMERS' COOPERATIVES

E. FRED KOLLER
University of Minnesota

THE financial requirements of farmers' cooperatives have expanded rapidly in recent years, much like the increases experienced in other sectors of our national economy. Larger sums have been needed for working capital purposes—to carry inventories and receivables, to meet higher payrolls, and other increased costs as the result of inflation. More capital has been needed to expand facilities the cost of which have risen phenomenally. Cooperatives are in need of added capital to improve their efficiency—to mechanize and to make other improvements—in order to compete more effectively and fulfill their role in the economy.

However, it is not the objective of this paper to consider the needs which cooperatives have for capital. Rather, the purpose is to consider the alternative sources from which these funds may be obtained and some of the problems associated with each. The sources and problems of obtaining equity, or risk, capital from patrons will be given particular consideration. A few aspects of obtaining borrowed capital will be considered.

Relatively few cooperatives have ready access to all the funds they need. There are a number of reasons for this situation. First, most cooperatives are small business institutions and, therefore, face the financing difficulties characteristic of these firms. Their loans are relatively small and financing costs are high on a per dollar borrowed basis. In view of their size, most cooperatives are not widely known nor is the quality of their management. Cooperative business methods, financing, and securities still are not well known to many investors.

The cooperative has additional limitation in its access to capital imposed by the cooperative nature of its business. Ownership and control by the users (patrons) must be assured, but this limits opportunities to obtain equity capital from a broader capital market. The "operation at cost" or non-profit, basis on which cooperatives operate reduces the appeal of their equity securities to the outside investors. The cooperative principle of limited returns to capital likewise reduces investment attraction to non-patrons. Therefore, cooperatives must place heavy reliance on those who use their services (farmers) for the very important equity capital. In

many cases farmers have had their own difficult problems in supplying their direct production capital needs; the problem of obtaining more capital for their cooperatives has been accentuated as a result.

Ratios of Debt and Equity Capital

As in other types of business enterprise, the funds used by cooperatives are obtained either from owner or creditor sources. Examination of the financial structure of a large cross-section of farmers' cooperatives in the United States in 1945-46 showed that they had obtained 56.4 per cent of their funds from owner or equity capital sources.¹ The remaining 44.6 per cent was financed by the use of credit.

The proportions of capital obtained from creditor and owner sources vary widely among cooperatives and reflect many different forces and financial policies. For instance, the relative use of debt and equity financing is affected by the amounts of net margins or product retains which the cooperative can hold in the business. Associations with ready access to such funds can reduce their debts and build up their equity capital. Accessibility of financial markets affects the relative use of equity and debt financing. Some small cooperatives may have high fractions of owner equity simply because they are unable to borrow in their limited local financial markets or are unwilling to borrow on the credit terms available to them.

Tax, legal, and institutional considerations of various kinds affect the equity to debt ratios as do the technical nature and risk qualities of the assets. General business conditions, as well as conditions in the capital markets, are among other factors affecting the proportioning of debt and equity capital. In view of the many variables involved much managerial skill and judgment are needed to effect the best combination of debt and equity capital in a given association.

While various combinations of debt and equity capital may be used effectively under different conditions, it is generally recognized that the soundest financial plans are those in which the owner equities are the largest proportion of the total capital. Most cooperative managers would like to have at least two dollars of equity capital for each dollar supplied by creditors. Another commonly sought goal is that equity capital should be large enough to finance the fixed assets and at least the normal working capital needs. If these ratios are accepted as a sound for the typical cooperative, we can see the relative magnitude of the equity financing job facing these organizations.

¹ Data from a study of the financing of farmers' cooperatives now in progress in the National Bureau of Economic Research, New York.

Sources of Debt Capital

Like other business firms, cooperatives make extensive use of credit furnished by their suppliers—wholesalers, manufacturers, and others. Since the farmer patrons are the principal suppliers of the raw materials handled by marketing associations, credit supplied by patrons on commodities delivered under pooling arrangements constitutes an important source of capital. In our nation-wide survey, we found that 20 per cent of the capital of marketing cooperatives was supplied by patrons on an accounts payable basis.

Farmers' cooperatives place considerable reliance on loans from institutional lenders, including commercial banks, the 13 Banks for Cooperatives, and insurance companies. Data on the sources and amounts which cooperatives borrow from various credit agencies are very limited. In our 1950 Minnesota survey of cooperatives, we found that smaller local associations relied on commercial banks to a larger extent than any other institutional credit source. About half of the local associations which used borrowed funds obtained loans from commercial banks. About one-fourth of the borrowed capital used by local cooperatives came from this source. Only 18 per cent of the local associations which borrowed obtained their loans from the Bank for Cooperatives.

Among our large regional associations the situation was reversed. Two-thirds borrowed from the Banks for Cooperatives and 60 per cent of all borrowed funds were obtained from this source. Commercial banks supplied only 22 per cent of the borrowed capital of the larger associations.

The interest of institutional lenders in making loans to cooperatives is growing. In the 1946 survey we found banks ranging from small local institutions to some of the largest metropolitan banks expanding their loans in this field. In recent years, some of the life insurance companies have begun to make long-term loans to some of the large regional cooperatives. In the past 18 years the Banks for Cooperatives have been an important factor in enlarging the supplies of credit on which qualified cooperatives may draw.

While more suppliers of credit are available to farmers' cooperatives today, many still face difficult problems in obtaining the loan accommodations they desire. Credit advanced by these institutions is generally very carefully rationed. Many associations are finding that the amounts which credit agencies will advance are far short of their needs. Another rather frequent complaint is that the maturities of loans are too short for satisfactory financing of many fixed capital needs.

Since the amounts of capital available from institutional lenders are generally relatively low, many associations have turned to individual lenders for additional supplies. In Minnesota we found that individuals

were the chief source of borrowed funds of the local associations and supplied a little over one-fourth of the total borrowed. Most of this borrowing was on the basis of individual notes. In recent years more of the large regional associations have sold debt securities to their patrons and the public. Generally, these securities are debenture bonds, certificates of indebtedness, and other unsecured obligations since most of the mortgagable assets are pledged to their institutional creditors, or are held in readiness for such use.

Cooperatives sell their debenture bonds and similar securities to their patrons and members as much as possible. Often patrons have acquired so much equity capital under the retained capital (proportional financing) programs of their cooperatives that they desire to have the debt type when they buy additional securities outright, because of their definite annual return and maturity dates. In addition, debt securities are more acceptable for collateral purposes than stock and can be liquidated more readily if needed. Some associations are extending the sale of debt securities to the general public, not only for the additional funds this provides but also as a means of improving public understanding of cooperatives in the trade area they serve.

Another reason for increased emphasis on debt securities in recent years is that it has been increasingly advantageous for nonexempt associations subject to high income and excess profit taxes. General business corporations are showing a similar tendency in the direction of more debt financing. Cooperatives need to be careful, however, not to over-balance their financial structure with too large a proportion of debt. There is real danger that the interest payments may become burdensome in a period of poor business or that maturities may come in a period of adversity. Only the associations with relatively large and stable net margins, or those which have a well-developed program of product retain financing, can afford the risk of a relatively large debt.

Sources of Equity Capital

However, the larger and more persistent problem of cooperative financing is that of acquiring an adequate amount of equity capital. The equity capital of cooperatives may include combinations of preferred stock, common stock, various types of certificates of equity, patron book credits, equity (net worth) reserves, and other items. Some of these equities have been acquired by outright sales of securities to patrons and occasionally others. The largest part of equity capital has been obtained by retaining patronage refunds or product retains in the business on a proportional financing basis. Some associations still retain a small amount of unallocated margins in their equity capital.

The sale of common stock of cooperatives generally is restricted to active patrons since the ownership and control of the association must remain with the farmer-users if it is to qualify as a farmers' cooperative under the law. In an increasing number of cases, the funds derived from the sale of common stock are of nominal importance and a large proportion of equity capital must be obtained from the issue of other equities.

Many associations are obtaining equity capital by the sale of securities, usually preferred stock, to the public and to those of their patrons who may desire to invest beyond the usual "proportional to use" requirements. Since preferred stock does not involve voting rights, it may be sold to non-patrons and a wider capital market may be tapped. The advantage in selling preferred stock is that it has no maturity date and no promise of fixed annual payments, which is in contrast with debt securities. However, in many cooperatives the terms of the preferred stock are regarded as nearly as fixed as those in bonds or notes. Associations often go to great lengths to avoid passing a dividend in fear of investor (largely patrons) reaction. Furthermore, it is a rarity to transfer the preferred or common stock of a cooperative on any other basis than par. In view of these unwritten conditions associated with preferred stock, it may be seen why some associations consider the choice between debenture bond and preferred stock financing as a near tossup. Since net margins used in paying dividends are subject to income taxes in the non-exempt associations, one can understand why these organizations are setting up at least part of their financing on a debt security basis.

Net Margin and Product Retains

The largest single source of equity capital is that obtained from net margins retained in the business in the form of non-cash patronage refunds. In this respect farmers' cooperatives are like other businesses which also rely extensively on net margins for their financing.

Most of the net margins retained by cooperatives are allocated (credited) to the patrons on a proportional basis. In their earlier history many cooperatives retained net margins much like ordinary corporations by placing them in surplus or reserve accounts which were unallocated and belonged to the stockholders in proportion to the share held.

Patronage refunds retained in the business are evidenced in various ways. Some set up stock credits to the account of their patrons and issue common or preferred stock when credits reach the value of a share; some issue special certificates of equity while others merely set up patron book credits; still others retain net margins in various equity (net worth) reserves which also are allocated to patron accounts; and a few set up deferred refunds in the form of debt securities. Some set up unallocated re-

serves, but under the Revenue Act of 1951 these items are subject to income taxes in exempt and non-exempt associations alike. In our Minnesota survey in 1950 we found that of all the patronage refunds retained in the business, 49 per cent were set up in stock credits, 46 per cent in book credits or allocated reserves, and five per cent in capital equity certificates.

The retention of patronage refunds facilitates the acquisition of equity capital but it is not entirely painless or costless. Patron resistance must be overcome since some do not like the idea of a deferred refund; in some cases, patrons severely discount the value of such a refund. Often this attitude arises from the indefinite and unduly delayed repayment of these refunds, which may breed doubts whether payment will be made at all.

When patronage refunds are used in building equity capital the process should represent a deliberate investment decision by the patrons, rather than an automatic painless extraction process of which they are only vaguely aware. If the patron is to have a larger part in the decision he should be well-informed about his investment—its purpose, from what sources, and approximately when it will be repaid. Conveying this information is the responsibility of management. Cooperative management may well consider that if deferred patronage refunds are to remain untaxed, it may become important to demonstrate that these are actual investments by the patrons and not a process of which they are unaware.

Many associations, particularly those on the West coast, acquire much of their equity capital from product retains. Under this plan, a definite amount is assessed and retained per unit from the proceeds of products marketed, or a capital charge added for each unit of supplies purchased, for the purpose of financing. For example, an association may retain one cent per pound of butterfat, one cent per bushel of grain, or one cent per dozen of eggs for capital purposes. The product retain may be evidenced in various ways, much like the deferred refunds described above. This plan of obtaining capital has a number of advantages over that of retaining refunds. For one, the product retain is a clear-cut capital charge which impresses upon the patron his responsibility in financing the association. In addition, a per unit capital charge is a more certain source of funds from year-to-year than are retained net margins which may fluctuate widely. Associations using the product retain plan can distribute all their net margins in cash refunds, thus avoiding the problem of taxable income.

An effective program of equity capital financing from patron and member sources depends to a large extent on a well-informed membership. Provision of the necessary information must be regarded as part of the cost of an equity financing program. Members should understand for what purposes additional capital is needed, and that the responsibility of sup-

plying the basic equity capital rests with the members who are essentially partners in the cooperative business. If members want additional services from their cooperatives, they must be willing to provide some of the needed capital.

Revolving Capital Plans

Under both the deferred refund and product retain methods of financing, patrons are concerned with the repayment of the funds which they have invested. To solve this problem an increasing number of cooperatives have adopted provisions to repay on a revolving basis the capital retained from patrons. Under the revolving capital plan, funds are obtained from the patrons in some way proportionate to patronage. These retains are continued until the amount of capital has reached a desired level. When this stage is reached, the oldest capital increments are returned to the patrons each year at the same time that new retains are made in a continuing process.

Revolving capital plans are used by all types of cooperatives—local and regional, large and small, stock and non-stock. Data on the extent of its use over the nation are meager. In Minnesota, about 45 per cent of our 1,341 farmers' cooperatives have adopted the plan. The balances in all of the revolving capital accounts of these associations totaled 75 million dollars. This was equal to about 53 per cent of the equity capital of all the associations.

An important aspect of revolving plans is the flexibility they provide in the accumulation of capital from patrons. The build-up of capital may be slow and extended over many years, or it may be rapid reaching the desired level in a few years. A major determining factor is the rate at which capital is being retained. Generally, the amount retained cannot go much beyond the point where current returns received by producers fall below those they might receive from competing concerns. This is a difficult adjustment to make and the effect on patronage must be considered.

A second major factor affecting capital accumulation under this plan is the length of the revolving period adopted. This feature probably has presented more difficulties than any other. The temptation has been to lengthen the revolving period to the point where patrons have become discouraged. Associations which depend on patronage refunds as the source of capital revolved often have the greatest problems, since there may be a period of years when net margins are too small to retire the oldest capital. When this occurs, the revolving period must be lengthened. Often the length of the revolving period is varied with business conditions and the financial condition of the association. In good times, the revolving period is gradually shortened by repaying more than one of the oldest capital increments; in less prosperous times the period may be lengthened by postponing repayment in some years.

A problem closely related to the length of the revolving period is that of the due date of the equities issued. Some associations set the due date at the time of issue. Patrons favor this practice since it allays their fears of indefinite deferment. Also, equities with due dates are more satisfactory for loan collateral purposes. A major disadvantage of a fixed due date is the embarrassment it may cause if it comes in a period of adversity. And too, securities with due dates are classified as debt capital and may result in a "poor statement" from the lending agency point of view.

In most revolving plans, the date of repayment is left to the discretion of the board of directors. This arrangement generally is desirable since it permits adjustment to changing business conditions and the changing financial condition of the association. The danger is that some boards may make unwarranted use of the deferment privilege. In our state we found that of 346 revolving plans which had reached the repayment stage, 121 had a revolving period of less than five years. Another 166 revolved in from five to 10 years. Only 19 plans had revolving periods fixed in advance.

Frequently, the question is raised whether interest or dividends should be paid on revolving capital. Such payments often are considered an unnecessary expense since this capital generally is retained on a proportional basis. If the revolving plan departs widely from the proportional investment ideal, interest or dividend payments are warranted. If payments are made, it is desirable that they be at the discretion of the directors, much like a dividend on common stock. In Minnesota, interest or dividends were paid on only 169 of 628 revolving plans.

In the operation of revolving plans, it is advantageous to issue book credits to the patrons rather than stock or other certificates. It has been found that the issue, and particularly the redemption, of certificates involves considerable time and expense. Lost certificates and delayed redemptions present a considerable problem. Under the book credit system, a simple statement showing changes in the patron's revolving account is mailed to him after the close of each fiscal year. It is desirable to have at least some equity capital in book credit or reserve form in order to simplify administration in the event a loss should occur.

A problem frequently associated with the revolving plan, or other financing plans arranged on a patronage basis, is that some patrons are not in a financial position to hold a large volume of credits to maturity. To aid this problem various plans have been developed to transfer investments from those who are in need of funds to those who have funds to invest.

Another type of problem arises when revolving plans are used by

federated regional associations. Then it is important that the affiliated local associations adopt the same revolving period as the central organization, or they may face a severe drain of working capital. While the regional association is in the accumulation stage of the plan, the local associations receive non-cash refunds and few can afford to pay these to their members in cash.

The revolving capital plan presents many advantages. One of the most important of these is that it provides a means for cooperatives to obtain adequate supplies of equity capital on an installment basis from their patron owners. Many cooperatives have materially improved their equity to debt ratio and over-all financial position with the aid of this plan. The plan is ideally suited to the cooperative method of business since the patrons help carry financial responsibilities of the organization somewhat in proportion to the use they make of it. Currently active patrons bear most of the financial load, enabling the association to repay the equities of those who are no longer farming in the community or are deceased. Furthermore, the revolving plan facilitates keeping the voting control of the cooperative in the hands of those who use it.

Like other human institutions, the plan also has its limitations. The very ease of capital accumulation may lead some managements to embark on expansion programs which are unsound and which may represent a poorer use of the funds than the patrons may have made of them. Some of the operational problems associated with the plan have been discussed. The revolving plan adds greatly to a cooperative's already large accounting tasks. Probably the largest impediment in its use is the problem of patron understanding. A considerable educational job is involved in making clear to the patrons the purpose and operation of the plan. What is more, the job of patron education is a continuing one since there generally is a large turnover of patrons each year.

The revolving capital plan should not be regarded as a solution for all of the equity capital problems of cooperatives. However, when used properly in one of its many forms, it can be a highly useful tool in improving the financing of these organizations.

DISCUSSION

GEORGE F. HENNING
Ohio State University

We can generally agree with the main points of Professor Koller's paper. I would like to discuss only some points omitted or too briefly mentioned.

First, it should be remembered that cooperatives are going through a trial and error period relative to financing. It has not been easy for cooperatives to develop a financing plan that was sound, workable, flexible, equitable, and yet

understandable and acceptable to the membership. I suppose there are few plans that rate very high in all those requirements. We also will agree that no one financing plan is suitable to all cooperatives.

Second, financing cooperatives may be considered from several points of view: (a) the cold-blooded business or management point of view; (b) the point of view of the member or patron or both; and (c) a combination of both (a) and (b). I am inclined to favor the latter.

Third, cooperatives must adopt the kind of financing plan that best serves the purpose of each cooperative. The question of income tax exemption is important at the present time. Some coops, which have recently given up exemption, are switching from stock financing over to debentures, certificates of indebtedness, or other kinds of debt financing in order to charge off as an expense the cost of using such capital.

Fourth, the kind and nature of operations of the cooperative must be considered. A small milk bargaining cooperative's financial needs are different from the milk cooperative engaged in processing and distributing to consumers in a large city. Cooperatives which make every patron eligible for membership does need a financial program different from the cooperative that transacts a considerable volume of business with nonmembers.

Financial Plan Must Fit Needs

We must recognize then that cooperatives have their own individual financial needs and need a program to meet those needs.

Cooperatives must adopt a financial program that best answers their particular problem and work to that end. If it means using the revolving capital plan, fine; but if some other plan is more suitable, adopt that plan. The main point is to be soundly and adequately financed.

In a recent letter, P. A. Nichols, director of finance of the Consumers Cooperative Association of Kansas City, Missouri, states: "a well financed farm supply cooperative needs to get its capital from three sources. Probably one third should come from so-called permanent capital—common shares, patron equity reserves, and corporate surplus. A second third may come from deferred patronage refunds and revolving fund certificates. Thus, two thirds is held roughly in proportion to patronage—assuming, of course, that common shares are issued as a portion of each patron's earnings and that corporate surplus derived principally from non-members business, never bulks large in the total. The final one third of the coop's capital may well be held disproportionate to patronage, and should represent direct, 'cash out of the pocket' investments by individuals in the form of certificates of indebtedness, preferred shares, or other due date obligations."

You may disagree with Nichols' formula but it represents the best thinking to date of an organization that has experienced considerable financing problems.

Let us now consider a few illustrations. Would anyone seriously criticize the financing plan of a local elevator and farm supply cooperative that had \$200,000 in common stock owned by the farmer members, plus a reserve of more than \$50,000; that had not a dime of borrowed funds, that paid no more than three per cent on the common stock and the balance in patronage refunds and offers open membership to any farmer in the community?

Or would one seriously consider changing the revolving finance plan of a district poultry and egg cooperative operating in approximately 25 counties with about 3,600 members that have membership capital of \$25,000, patronage

refunds retained in the form of certificates of ownership of \$235,000, and a contingent reserve of \$20,000 and no borrowed funds? All patronage refunds retained prior to 1944 have been paid back to the patrons and on April 1, 1952, the patronage refunds of 1944-45 of over \$31,000 were likewise returned.

These illustrations (one revolving and one non-revolving) show that such cooperatives are well financed with a simple capital structure that is understood and accepted by the membership, and is ample for the business needs of the two cooperatives. True, these examples could be criticized but they represent an approach to an obtained goal in financing. *Too many cooperatives are not set on their goal because they are continually changing their plans of financing.* This confuses the membership and the financial instruments do not become "seasoned," accepted, and understood.

Are some of the financing problems of our cooperatives due to the fact that they want to expand too fast, or at least faster than the members will furnish the funds? Is it expansionitis? They borrow funds from financing institutions to build new facilities or to enlarge operations or to enter new fields. This may be the easy way when the directors and management see new opportunities for cooperative activity. Our larger cooperatives can use their facilities as collateral and borrow from financial institutions or the Bank for Cooperatives. It is primarily this activity which has been responsible for the rule that Professor Koller suggests that "for each dollar which creditors may supply, two additional dollars need to be obtained from the patron and member group." We don't disagree with that rule for most cooperatives, but I would suggest that it is sounder and safer to have less than one third borrowed funds.

With cooperatives expanding and borrowing for justifiable reasons, suddenly the management realizes that the equity capital debt ratio is out of balance. Then a big drive is put on to secure more equity capital. When secured, then there is more expansion, etc. I don't mean to say all cooperatives follow this practice, but haven't all of us observed this policy?

If this policy hasn't previously been adopted, then two procedures can logically follow: (1) Patronage refunds are not returned in cash but certificates are issued to build up the capital or (2) a retain plan is adopted (a few cents per unit of physical volume or a certain percentage of sales or purchases is deducted). If patronage refunds are reasonably large, then (1) works well, if not, (2) is more desirable. Thus, the patron member (not considering his financial ability) becomes involved in a forced loan to the cooperative, based on patronage. Is such procedure entirely desirable?

The next obvious step is to revolve this capital when the refunds or deductions retained are sufficiently large. It is a painless way to secure funds and is becoming rather popular with Cooperative Marketing as Professor Koller points out, since 45 per cent of the 1,341 Minnesota cooperatives were using the plan in 1950. But I suggest it is only a step to sounder financing.

Disadvantages of Revolving Capital Plan

Professor Koller has pointed out the advantages of the revolving capital plan. We agree with them but would suggest also that revolving capital plans may be used to furnish a source of capital for which no interest may be paid if the capital is kept proportionate to patronage. Now, let us pass over to the limitations and disadvantages.

Cooperative leaders from cooperatives like the G.L.F. Exchange of New York, Poultry Cooperative Association of Wooster, Ohio; the Consumers Co-

operative of Kansas City, Missouri; and Professor H. E. Erdman of University of California point out these disadvantages to the revolving capital plan:

1. The farmer is not given a choice. Investment is not voluntary but automatic and compulsory.

2. After a cooperative has gone through a span of 5-10 years (the period used to set up the revolving schedule), there is no further opportunity to increase the resources of the cooperative unless the current retains exceed those being paid off.

3. For some cooperatives, as many as five percent of the certificates are less than one dollar, creating a bookkeeping problem. Difficulty in retiring the revolving capital also is caused by people moving away and no or poor addresses being given.

4. Farmers must record as income (on their personal income tax returns) when patronage refunds are revolved but they receive no cash to pay the tax.

5. The new patron will receive no cash for a number of years. This is a hardship on him, especially if the prices are on a very competitive basis and with very narrow margins.

6. A permanent source of capital is not provided.

7. Financial institutions, especially commercial banks, are inclined to look upon revolving capital as an obligation rather than permanent capital.

8. Farmers want due dates on the financial instruments because they fear that expansion-minded directors might defer repayment indefinitely in order to finance some expansion program.

9. There is the problem of paying or not paying interest on the financial instruments used in the revolving capital plan.

Revolving finance plans have some difficulties along with their advantages and probably are not the final answer to financing cooperatives. They do offer to cooperative management, however, an important tool that may be used very advantageously.

Ability of Patrons to Finance Coops

Now let us consider some other aspects of cooperative financing. First let us look at the types of patrons and some aspects of their abilities to finance cooperatives.

1. Young tenant farmers struggling to build an efficient operating unit. Most of them are short on capital.

2. Middle-aged farmers attempting to expand operations or improve their farms; tenants attempting to buy farms. Farmers in this class are sending their children through high school and college and are often in need of capital.

3. Farmers who are middle-age or older but who have not been successful financially or have met reverses during their lifetime through sickness or otherwise. These farmers also are short of capital.

4. Farmers who are financially established, or are well financed, and are looking for opportunities to invest their money.

Groups (1), (2) and (3) are a sizable percentage among our farmers even in prosperous times like the present. Too many cooperatives have ignored the handicaps, burdens, and difficulties of these people in furnishing finances for the cooperatives. The revolving capital plan—based on retains or deductions of fixed amounts per unit of volume, per dollar of sales or purchases—places an undue burden, it seems to me, on all but the well-to-do farmer.

The revolving capital plan, based only on retained patronage refunds, is

not a serious handicap assuming the cooperative is competitive on price, quality, and service. However, if the farmer gains by patronizing the cooperative only in the amount of the patronage refund received, then it is about a toss up except for the income tax aspect which cannot be ignored entirely. A farmer no doubt is concerned when the cooperative notifies him that his annual patronage savings has been retained for financing capital. But when the cooperative further states that he should include the amount of the savings in his income tax return, then strange thoughts start through his brain, not always complimentary to the cooperative. This especially concerns him when he realizes that he must take cash out of his pocket, based on the 1951 return, at the rate of \$20.40 per \$100 of patronage refund if his taxable income was under \$2000, but \$22.40 if his taxable income was between \$2000 and \$4000 etc. for higher incomes. However, if the cooperative is revolving on a five or seven year plan it is not so bad if the farmer has a clear understanding of the plan, but if the farmer doesn't understand some of the complicated revolving capital plans it often leads to bad membership relations.

At this point, I should like to redirect your attention to the point made by Dykes of G.L.F. G.L.F. has the income tax aspect of cooperatives licked by paying patronage refunds in cash. They then ask the farmer to invest in the cooperative. Thus "*investment is voluntary, not automatic and compulsory.*" To me this should be the goal of our cooperatives.

The Consumers Cooperative of Kansas City, Missouri, recently adopted the plan of paying 20 per cent of their patronage refunds in cash and placing the balance in their revolving plan of financing. It became effective September 1, 1952.

Both of these plans overcome the income tax objection mentioned above and I recommend the principle to other cooperatives.

Needed: Market for Coop Securities

I am convinced that it is wise, sound and desirable cooperative financial policy to provide for some type of market for cooperative securities. For the smaller cooperatives, this may be no more than bringing the buyer and seller together based on the offer to sell and the bid to purchase—in reality "an over the counter market." This is very important for cooperatives on the revolving capital plan.

A separate fund could be established to stabilize the price and facilitate the exchange of the securities of a cooperative. Management and directors could then observe more closely how patrons respond to methods of financing. The Poultry Producers of Central California have taken an important step forward to eliminate criticisms by giving their cooperative securities a market. I quote from a letter of John Lawler, general manager:

"The revolving plan, in our opinion, is the only logical method of financing a cooperative. Some organizations, as you know, issue book credits only to their members and do not go to the expense of issuing revolving Capital Funds Certificates. We prefer to issue the certificates, so that members who may not be so well financed can use them as a source of credit by borrowing on them or may sell them.

"For many years our Association has maintained, through our wholly-owned subsidiary, Producers Company, Ltd., an account known as the Producers' Investment Fund. The Investment Fund is the agency through which Association members find a ready market for their Capital Fund Certificates when

they wish to sell them, and they receive their par value plus accrued interest. The Investment Fund also acts as the agency through which Association members who have surplus funds may invest in additional Capital Fund Certificates, represented by Investment Fund Certificates issued by the Investment Fund."

"We have been quite proud of the useful service performed by the Investment Fund in past years. Reflecting upon it, however, we think the program is probably lacking in one respect, in that it does not keep all members of the Association carrying their pro rata share of investment in the Association at all times. We have never found any lack of interest on the part of members by reason of their sale of Capital Fund Certificates before their normal retirement dates, but we must admit frankly that we have made it too easy for members to dispose of them. It is not unusual for a reasonably large producer member to have accumulated as much as \$10,000 worth of Capital Fund Certificates at one time."

M. G. Mann, general manager for the Farmers Cooperative Exchange for Raleigh, North Carolina, wrote in a recent letter:

"Another unique plan which we have incorporated in the handling of our finances is to have set up a revolving fund of \$25,000.00 for both the Class "A" and Class "C" investment stock, and management is authorized to purchase stock as surrendered by the owners up to this amount. Today we do not have a dollar's worth of this stock in the revolving fund, the demand for it being greater than the amount surrendered.

"In passing, I would like to state that our members and patrons purchased for cash during the month of June \$74,475.00 of our Class "C" 4% preferred stock. For the year ending June 30, our sales of this stock totaled more than half a million dollars."

Such a market for cooperative securities or a similar one will aid in the closing of estates, or return the capital to a patron if he needs it when he quits farming or moves from the community.

Cooperative plans of financing more than likely will be influenced considerably by what happens in the future. Some cooperative leaders are convinced that cooperatives in the next 20-30 years will drift to something more like present business corporations. Some believe cooperatives will be paying federal income taxes or some kind of a collection fee or tax in place of it, or the cooperative will be required to withhold the tax on patronage refunds for the patron rather than depend on the individual farmer to report the patronage refund as at present. Some believe many cooperatives will pay patronage refunds only to members and will pay income tax on the non-member's business; thus moving away from the True Cooperative principle over more toward the principle of the business corporation. Such a change would eliminate the heavy accounting load cooperatives are now forced to carry. Future tax laws will be a big influencing factor with this aspect of operation.

If we assume these situations may happen entirely or only in part, it seems to me our cooperative financing may be changed. From the non-member business, cooperatives may build up an unallocated reserve or surplus. Financing may be (probably will be) shifted over to more permanent type of securities or of long-time maturity such as stocks, bonds, debentures, certificates of indebtedness, or ownership depending whether the cooperative is a stock or non-stock type of organization. Financing then will become more stable and capital will be retired at death, or returned to the member if he moves from the community or no longer needs the services of the cooperative. At present there

is a definite trend from the stock type of financing over to the debt type like debentures, certificates of indebtedness, etc. This enables the cooperative to charge the cost of such capital as an expense and lowers the income tax liability, which makes it more favorable to the holder of such securities. Consumers Cooperative of Kansas City is an example.

However, I believe this can be carried too far. Members should hold sufficient risk capital plus unallocated reserves to serve as a cushion to the cooperative in case of "rough going." It seems very unwise to have many securities upon which a dividend or interest rate is cumulative. A small percentage less than 20-25 per cent might not be objectionable if such a requirement is necessary to secure capital, but it places a heavy burden on the cooperative when profit margins for business are nil.

Summary

Financing is one of the difficult present-day problems for expanding cooperatives, and is likely to be for the immediate future. If the plan is kept simple, is equitable, fair and understandable to the membership, then cooperatives should have little difficulty in financing their operations over the years ahead.

In closing, I should like to quote F. M. Armbricht, comptroller for the Southern States Cooperative of Richmond, Virginia:

"I don't know that I could point out any one method of financing cooperatives that I would call the most desirable. Circumstances and conditions . . . dictate the policies most desirable."

SPREADING THE RISKS IN COOPERATIVE CREDIT INSTITUTIONS

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THE question of spreading the risks of cooperative credit institutions beyond the limits of their own territory is not of recent origin. Nor is there anything approaching agreement on the extent to which risks should be shared, or the most workable mechanism to provide for risk sharing. Indeed, even today there are leaders in cooperative credit who maintain that the undesirable features of risk sharing by credit cooperatives outweigh any gains which might accrue from the process.

Private Lenders Also Spread Risks

Although the philosophy of risk spreading is rooted most firmly in the cooperative credit institutions, the practice also is followed to a limited extent by most private and commercial lending institutions. This is true because the private credit institutions, many of them with longer histories than the cooperative lending agencies of the Farm Credit Administration, have gone through periods of agricultural adversity and have learned the hard way regarding the necessity of spreading certain kinds of risks beyond their territory and their own limited capital structure. Depositors in commercial banks are protected in part by the Federal Deposit Insurance Corporation. Commercial banks also are in a position to extend more dependable credit service to their customers because they may use the resources of the Federal Reserve System to improve their local cash position when necessary. A country bank frequently participates with one or more banks in making a large loan, so it will not bear the total risk in case of default. Many banks have spread their total lending risks through rather sizeable participation in insured and guaranteed loans of one kind or another.

Land Banks Have Broadened Risk Base

When the Federal Land Banks were organized in 1917, risk spreading was limited primarily to the local National Farm Loan Associations. Borrowers through the Federal Land Banks were required to purchase stock in their local NFLA's in a sum equivalent to five per cent of their loan. In the early years, this stock carried double liability, and was assessable in the event of financial insolvency of the NFLA. The NFLA indorsed every borrower's note to the Land Bank. In effect, this meant that the Land Bank would not take a loss on a loan before the total resources of

the endorsing NFLA had been exhausted. Risk sharing under this arrangement was primarily among the borrowers in the local NFLA, and secondarily among the NFLA's which in turn owned the Land Bank.

Subsequent experience in the Land Banks proved the basis of risk sharing outlined above to be too narrow. Large numbers of NFLA's became insolvent and ceased to operate in the 1920's and early 1930's. An important objective of any national credit agency must be to keep its local operating units financial healthy wherever possible—not to liquidate them. Since 1933 the Federal Land Bank System has engaged in a long process of extending the base upon which lending risks lie. For several years the Federal Land Banks have had agreements with the local NFLA's to share 50 per cent of loan losses. Since each Federal Land Bank is owned by the NFLA's in its own district, the effect of this loss-sharing arrangement is to spread losses absorbed by the Federal Land Bank among all NFLA's in the district, in proportion to their stock holdings in the FLB. Going even beyond this arrangement, all 12 Federal Land Banks issue consolidated Federal Land Bank bonds, thus ultimately spreading the risks over the entire system.

Risk Sharing by PCA's Is Limited

The Production Credit System is relatively young among cooperative credit institutions. Created in 1933, its lending experience, in the main, has covered years of rising prices and good times for farmers. The system was born during the era of tight commercial bank credit at the close of the 1933 depression. Production Credit Associations often boast of "credit that will be available in bad times as well as good times." Yet the ability of the PCA's to deliver on this motto has never really been tested. They have never operated in "bad times."

Individual PCA's have no way of sharing risks with each other, nor recourse to any substantial assistance in time of distress, other than government capital which remains in the Production Credit revolving fund. And this fund has been substantially reduced from the 120 million dollars which was available in the early years of the Production Credit System. There is at present no way in which an association's risks can be extended beyond the limits of its own territory, other than through the infusion of additional stock from the government capital revolving fund, through the Production Credit Corporation in the district. Even this source of aid is not easily available to those PCA's which have entirely retired their government capital.

It is thus evident that individual PCA's could quickly find themselves in adverse financial condition as a result of emergencies beyond their control, such as a bad crop year in a particular territory or a temporarily

depressed price for a major commodity produced locally. Some scheme for extending risks, partly at least, beyond the individual PCA territories would make it possible for many PCA's to continue their lending operations through periods of temporary economic adversity.

In 1951, Governor I. W. Duggan of the Farm Credit Administration appointed a committee to study this problem and to review possible plans for spreading risks among Production Credit Associations. The committee consisted of F. F. Hill, Cornell University, chairman; G. H. Aull, Clemson College; E. L. Butz, Purdue University; R. A. Gans, Federal Land Bank of Springfield; W. G. Murray, Iowa State College; and R. J. Saulnier, Columbia University. The report of this committee has been published as FCA Bulletin CR-5. The remainder of this paper will deal largely with the conclusions and recommendations of the committee.

The first part of the committee report summarizes the loss experience of Production Credit Associations to date, and analyzes the present position of PCA's from the standpoint of their ability to bear risk. The second part of the report proposes five different alternative methods for improving the ability of PCA's to meet the risks inevitable in agricultural lending without interrupting their supplying credit to farmers.

PCA Loss Experience Has Been Good

The over-all loss experience of PCA's since their organization in 1933 has been good. Total losses for the entire system through 1950 amounted to only \$6,413,000, or less than 0.1 per cent of the nearly seven billion dollars loaned. However, loss ratios were much higher in the early years of the system than they have been since the war time inflation started in 1940. In 1938, for example, net losses (actual plus estimated) reached 0.88 percent of total loans outstanding. This figure was as high as 2.92 per cent in the Springfield district and 2.31 per cent in the Berkeley district. The price rise following 1939 converted many of those estimated losses into net recoveries. However, if the price downturn which started in 1938 had continued another year or two, a considerable number of PCA's might have had a close flirtation with distress. As it was, only eight PCA's have been liquidated primarily because of actual or anticipated losses. All of these liquidations occurred during the years 1935 to 1938. These eight associations had loaned a total of \$24,812,000 with losses on loans amounting to \$1,281,182 or 5.2 per cent of the total amount loaned. In six of the eight associations, liquidation resulted in complete loss to the members of their Class B stock, and only partial recovery by the Production Credit Corporations on the Class A stock they owned in these associations. In addition, nine other PCA's have experienced losses which wiped out their valuation reserves and accumulated earnings and impaired their Class B stock, but were able subsequently to eliminate the impairment.

While the lending operations of PCA's have never been tested during a prolonged price decline, no one can conclude PCA's would be immune from the inevitable relationship between economic conditions and loss experience which crippled hundreds of commercial banks during the 1920's and 1930's. The loss experience ratio of commercial banks engaged in farm lending since 1934 has been very similar to that of PCA's. There is little reason to believe that the loss experience of PCA's, had they been operating in the 1920's, would have been substantially different from that of commercial banks.

No Region Is "Loss-Proof"

Any proposal for risk spreading among cooperative credit institutions will be most warmly received by associations in "high risk" territory, and will be viewed skeptically by associations in "good" lending territory. Whether a particular geographic region is "poor" or "good" lending territory depends partly on the time from which it is viewed. The highest PCA loss experience from organization to date has been in the Northeastern, Southeastern, and Northwestern parts of the U. S. In contrast, loss ratios in the Great Plains and Mountain States have been very low. This is true because the types of agriculture most prevalent in the latter named regions have prospered most under the inflation of the last dozen years.

The geographic pattern of PCA losses since 1934 contrasts sharply with the pattern of farm financial distress during the 1920's and 1930's. During the former years, highest foreclosure rates were in the Great Plains area, and high rates were also prevalent in the Mountain States and the Cotton Belt. Failure of country commercial banks was clearly heaviest in the Great Plains states—the very area with the best PCA record since 1934. It should be obvious that experience with farm loans during one period is not necessarily a reliable guide to the experience that may be expected under a different set of economic conditions. What is a low risk territory during rising prices may be, and often is, a high risk territory during a period of falling prices. The problem of risk spreading among cooperative credit institutions is truly national in scope.

Some Loans Are Large Relative to PCA Net Worth

Banking laws limit the size of individual loans to a certain percentage—usually 10 or 15 per cent—of the bank's capital and surplus. There is no such limit on PCA loans, although individual loans which exceed 20 per cent of the PCA's capital and guaranty fund must be approved by the Production Credit Corporation, and loans which exceed 50 per cent must be approved by the Production Credit Commissioner.

It is obvious that, other things being equal, the risk problem of a PCA is increased if a large share of its loan volume is concentrated in a few

large loans, particularly loans that are large relative to the association's net worth. Data tabulated for a sample of PCA's in each district in mid-1950 showed considerable geographic variation in the percentage of outstanding loans which exceeded 10 per cent of the association's net worth. Based on the number of loans, the range was from 0.03 per cent in the Louisville District to 1.9 per cent in the Berkeley District. Based on the dollar amount of loans, the range was from 0.89 per cent in Louisville to 15.68 per cent in Omaha. However, individual associations varied much more than this. One association in the Wichita District had 78.31 per cent of its total loan volume in loans exceeding 10 per cent of its net worth. If two or three large loans in such an association went bad, financial difficulty would quickly result. Some system needs to be devised so that the risk on large loans can be spread over a larger base than the territory of the individual PCA.

Capital Structure of Many PCA's Is Limited

At the time of their formation, PCA's were capitalized principally with government capital. In recent years substantial progress has been made toward their ultimate goal of complete farmer-member ownership. At the end of 1951, 238 of the 500 associations had retired all government capital. In 207 other associations, the member-owned capital stock plus accumulated reserves represented 75 per cent or more of the total net worth of the association. Some PCA's have probably retired government capital more rapidly than they should have. They used their earnings and proceeds from the sale of Class A stock to members to retire Government capital, and consequently were unable to add rapidly to their own capital account. As a result, total capital of the PCA's at the close of 1950 was only 16.5 per cent higher than in 1942. Yet during the same eight year interval, the volume of loans outstanding increased 119 per cent. It is thus apparent that PCA's, as a group, are less adequately capitalized now than they were in 1942. Indeed, many individual PCA's are practically "loaned up," in the sense that their ratio of maximum loans to total net worth is as high as permitted by prudent lending operations. Some arrangement should be worked out so that the capital position of individual PCA's can be bolstered from a mutually contributed and managed fund, when government capital is no longer available for that purpose.

Proposed Methods of Risk Bearing

There are three possible approaches to the problem of risk bearing. First, the system might continue under its present plan, leaving the problem of risk bearing to individual PCA's with help when necessary from U. S. government capital subscriptions. Second, it would be possible to

continue the present form of organization of the Production Credit System, but to institute some kind of cooperative action among PCA's which would spread risks on a district, regional, or even national basis. Third, risk bearing could be spread through substantial changes of the organization and risk-sharing policies of the major lending institutions operating under the Farm Credit Administration, particularly the Production Credit System and the Federal Intermediate Credit Banks.

Method 1: Continue Present System. This proposal simply means that individual associations must continue to strengthen their capital and reserve positions, to the point that they can absorb normal losses without impairing capital or interrupting their services to the farming community. This may involve reduced operating expenditures by the associations, increased margins between interest rates charged borrowers and discount rates paid the Intermediate Credit Banks, sale of stock to farmer-members, elimination of higher risk loans and avoiding extension of such credits in the future, and other such devices. In the main, the methods by which an individual association can improve its financial position are similar to those available to any commercial bank or other lending institution operating in a limited territory.

It should be pointed out that ever since their organization, PCA's have been encouraged by the supervisory personnel in their districts and in Washington to build strong reserves. However, their loan volume has grown so rapidly that reserves have not even kept pace with volume. Indeed, in terms of their over-all position, Production Credit Associations as a group are in no better position to absorb losses than they were 10 years ago. This arises partly because a good share of their government capital has been withdrawn. However, it is probably not sound policy on the part of any cooperative institution to retain government capital permanently, if arrangements can be made for the institution to stand on its own financial feet.

Method 2: Risk Spreading Through Cooperative Action. Two different proposals are advanced to spread risks through cooperative action on the part of the PCA's, making no change in the present form of organization of the system. The first plan provides for establishing a group insurance reserve through assessment against insured PCA's. Each PCA might be called upon to contribute a certain percentage of its loans outstanding over a recent period (say 2.5 per cent) to a central insurance reserve fund. After that each association would be assessed annually at a much lower rate on its average amount of loans outstanding (say one-fourth of one per cent). These annual assessments would be added to the

central reserve fund until it reached a stated percentage of average (or maximum) loans outstanding in the insured associations (say five per cent). Thereafter annual reserve assessments would be varied, so as to keep the central reserve fund at the stated level, say five per cent. Obviously, the determination of the rate of assessment and size of the central reserve fund would be flexible.

It would appear desirable that a portion of any losses incurred by an individual PCA should be borne by the association itself out of its own reserves, with the central insurance reserve paying the other portion of the losses. A 50-50 sharing plan would be preferable to a 100 per cent coverage, because this would still leave each PCA highly responsible for the quality of its own loans, and would furnish a powerful incentive to make sound loans and service them well.

A number of questions arise in connection with this proposal. Would the fund insure all loans automatically, or would insurance be limited to certain types of loans meeting stated specifications? If eligibility standards are established, who will administer them? Should the mutual insurance fund operate over an entire Farm Credit district, part of a district, over a region including two or more districts, or should it be nation wide? A nation wide insurance program can, within reasonable limits, provide protection for district wide financial difficulties.

The principle of loan insurance is well established in the the United States, and large numbers of insured loans are made each year. Witness, for example, the large number of home mortgage loans made today under the protection of the mutual loan insurance program administered by the Federal Housing Administration. Even in the strictly commercial field we have credit insurance by companies set up to insure, at a fee, the credit risks involved in commercial accounts. There is little reason why the same thing would not work in PCA's.

The second method of spreading risks through cooperative action on the part of PCA's would involve the establishment of a group reserve for contingencies, which would be used to support the capital structures of associations that have suffered losses to an extent that threatens to disrupt their functioning as credit suppliers. This plan would differ from the one outlined above in that the method described above proposed to insure individual loans. This proposal would come to the aid of a particular association after it had experienced losses sufficient to impair its capital position. This would be similar to the present power of the Federal Deposit Insurance Corporation to come to the aid of distressed banking institutions where, in the opinion of the FDIC, the bank is one that should be supported.

The group reserve for contingencies might be set up initially under the

same plan as proposed for creation of the mutual loan insurance reserve. Many of the same questions of administration and management would arise under this scheme as were listed under the proposal to establish a mutual insurance reserve for insuring individual loans.

Method 3: Institutional Reorganization. It is possible to approach the problem of risk bearing and risk spreading in a way that involves certain organizational changes in the Farm Credit institutions. The first approach to this problem would be to organize the FICB's and the PCA's in an ownership pattern similar to that which exists among member-borrowers of PCA's and individual associations, and between the National Farm Loan Associations and the Federal Land Banks. This would mean that the PCA's would have to purchase the FICB's. This has in fact been frequently proposed by certain personnel in the PCA's.

As of June 30, 1951, the United States Government owned FICB stock in the amount of \$61,200,000. Reserves and surplus of the FICB's amounted to an additional \$40,400,000. If the purchase of the FICB's by the PCA's were made at the par value of FICB stock, this would mean that the Production Credit System would have to raise \$61,200,000 somewhere to purchase the FICB stock, and return an equivalent amount to the United States Treasury. This, in itself, would present certain difficulties, greater in some Farm Credit districts than in others. But assuming for the moment that it could be done, it would then be possible for loan risks to be spread within a Farm Credit district in the same general manner as they are now spread in the Federal Land Bank System. The operating margin of the FICB's would have to be adjusted to enable them to build up reserves to absorb their share of PCA loan losses, if such an arrangement were worked out. The effect of such a loss-sharing arrangement would be to spread losses absorbed by the FICB among all PCA's in the district, since the PCA's would own the FICB. Under such an arrangement, the FICB's could be authorized to use their resources to rehabilitate distressed associations. They could do this either from their own resources, or they might initiate a program to accumulate a reserve for this purpose out of regular assessments on the PCA's, as was proposed in the plan above. In any event, a provision of this kind would be similar to the presently declared policy of the Federal Land Banks with respect to rehabilitating NFLA's.

A number of operating problems arise in connection with this proposal. They mostly boil down to the fact that if \$61,200,000 of capital now in the system is returned to the treasury, operating margins would have to be increased somewhere along the line to make up for loss of income suffered from return of this capital. Since government securities currently

held by the PCA's earn an average rate of about 2.5 per cent, this would mean that equivalent earnings of approximately \$1,500,000 annually would have to come into the system. This sum might be reduced somewhat as a result of operating efficiencies that could be introduced coincidental with consolidation.

Under this proposal, it is likely that the Production Credit Corporations would be liquidated, and their supervisory functions turned over to the Federal Intermediate Credit Banks. If the Credit Banks were to assume the supervisory functions now done by the corporations, they would probably have to increase their earnings proportionately still further to absorb this added expense. It should be emphasized again that this proposal, which would remove all government capital from the Production Credit System and the Credit Bank System, would simply mean that borrowers themselves would have to shoulder certain costs now being borne from federal subsidy. Many students of the Farm Credit System are firmly convinced that any added costs incidental to complete farmer-ownership are well worth while.

Consolidate Production and Mortgage Credit

A final proposal involving reorganization of the system would consolidate production credit and mortgage credit under a new agency in each Farm Credit district which might be called a Federal Farm Credit Bank. Such a plan of consolidation of functions would be carried out through the entire system, extending from the Washington office through the districts to eventual consolidation of NFLA and PCA functions in the field.

The details of effecting such a reorganization would of course have to be worked out carefully. In general, however, this might be done with the PCA's in each district first purchasing their respective Credit Banks on the basis described above. There would then be formed in each district a Federal Farm Credit Bank in which would be consolidated the assets, the liabilities, and capital accounts of the Land Banks and Credit Banks. The newly formed Farm Credit Bank would then issue stock in exchange for Federal Land Bank stock now held by NFLA's and for Intermediate Credit Bank stock which would be held by the PCA's. Under this system the resources of the combined agencies would be fully available for the carrying of risks involved in both long-term and short-term loans.

Borrowers coming into this system presumably would continue to subscribe to its stock on the same basis as they now purchase NFLA or PCA stock. However, the Production Credit Association would subscribe for an equivalent amount of stock in the Federal Farm Credit Bank, just as the NFLA now does with the FLB. Or going even further, PCA's and

NFLA's in each Farm Credit district might be consolidated into local "Farm Credit Associations," which would make both production and real estate mortgage loans. Such an arrangement would provide a single bank of discount, a single bank of issue, and a single local source of cooperative credit for farmers. It would be able, within the proposed organization, to spread loan risks in any of the manners outlined previously. Obviously, such a consolidation would present numerous operating problems. However, they would not be insurmountable if a genuine desire were present to make the system work.

The proposals outlined here do not exhaust all possibilities, nor are they mutually exclusive. They range from the least difficult of buttressing what we now do, to the most difficult of complete legal consolidation of the Farm Credit units. Progress will be made toward the goal of spreading credit risks over a broader base only as leaders interested in cooperative credit discuss the problem intelligently and dispassionately, and develop within themselves a genuine desire to improve the ability of the system to extend adequate credit to farmers through bad times as well as good.

THE PRODUCTIVITY OF THE HUMAN AGENT IN AGRICULTURE: AN INTERNATIONAL COMPARISON*

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THE present study represents an attempt to document the thesis that the net earnings and productivity of the human factor in agriculture are significantly less than the earnings of comparable labor in urban industry. The countries studied are the United States, the United Kingdom, and France. The time span encompasses, roughly, the half century 1900-1950.

The underlying structural and historical forces which are responsible for this disparity are, I am sure, familiar ground for most of you. The economic environment is characterized by (1) a rapid rate of technological progress and capital accumulation; (2) a cumulative rise of from one to three per cent per annum in the national income; (3) a low income-elasticity of demand for agricultural products; and (4) a relatively high rural birthrate. This means that a sizable net transfer of labor from the agricultural to the industrial sector must occur if the real earnings of the human agent in the two sectors are to be equivalent at any given moment of time. Even if capital accumulation, labor saving technology, and birth rates were identical in the two areas, the low income elasticity of demand for primary products would, in and of itself, create the necessity for a sizeable marginal transfer of labor power to the urban sector if productivity of the human factor in both areas is to be equivalent. But the mechanism of reallocation does not operate instantaneously. Social and cultural barriers to farm-urban migration, even under conditions of full employment, are sufficiently intractable so that the marginal increment of transfer is not large enough to bring about equivalent earnings at any given cross section of time.

Implications for economic efficiency are obvious—since total product is maximized when marginal products of comparable agents are equalized, net productivity differentials between farm and industry mean that the economy is not making optimum use of its scarce human and material resources. This poses a problem for social and economic policy to facilitate migration and to increase mobility of resources generally without undue sacrifice of other political and social freedoms.

Methods

My particular investigation was undertaken as part of a much larger project under the direction of T. W. Schultz and D. G. Johnson at the

* Summary of award winning Ph.D. thesis filed at the University of Chicago.

University of Chicago. It focused on only one aspect of the problem discussed above, namely that of comparing the labor income of full-time farm workers (operators, hired laborers, and family workers) with full-time wages of comparable workers in urban industry. Moreover, the comparisons were made with reference to the economy as a whole; regional farm and industry data were not secured. The value of the *average* marginal product of the human agent in agriculture was derived by the "residual" method involving (1) the deduction of rent plus returns to capital from an estimate of net agricultural income, and (2) division of the resultant aggregate by the number of workers in agriculture. Since there is a tendency in some quarters to enumerate as a "worker" in agriculture everything outside the city limits which walks, crawls, runs or swims, considerable attention was paid to the problem of securing a reasonable estimate of the number of full-time equivalent workers in farming. The French statistics were particularly troublesome in this respect. (Their quinquennial census enumerates all farmers' wives as "operators," etc.)

Subsidiary measures of labor returns in agriculture were also secured. Subtracting the wage bill, plus imputed wages to family workers, from total labor income gives a crude measure of the farm operator's labor income. Various types of wage rate-data also were available.

For the United States, the income of the human agent in agriculture was compared with annual full-time earnings in manufacturing, though a separate adjustment was later made for the effect of unemployment. For France, agriculture was contrasted with occupations in provincial cities and in Paris (the available wage series for the former includes from 36 to 49 occupations, at various times, for male workers). For the United Kingdom, agriculture was compared with a selected list of industrial occupations compiled by the Oxford Institute for Research in Agricultural Economics.

It goes without saying that the chief difficulty in this or any investigation of relative earnings is that of securing *comparable* types of skills and abilities in the two or more sectors compared. In full generality, this is a problem for joint investigation by both economists and psychologists. But as a crude first approximation, we note that the earnings data for the two sectors refer to groups of individuals who differ with respect to such measurable characteristics as age, sex, and racial distribution, and years of school completed. If certain types of data are available, we can then compute what the average earnings of urban workers would have been had they possessed the same age, sex, racial, and educational characteristics as the farm work force. Unfortunately, it was possible to construct standardized earnings data of this type only for the U.S.

Another perennial problem in earnings comparisons of this type is the difference in cost of living between farm and urban sectors. Evidence for the United States indicates that this differential was about 25 per cent for recent years. For the United Kingdom, the cost of living adjustment was much more modest. In recent years, the living adjustment was not more than three to four per cent because British agriculture is highly specialized—the farm household buys much of its foodstuffs through regular market channels and the degree of articulation between town and country is quite close. As for France, the less said about cost-of-living statistics, the better.

Findings

Our major conclusion is that the farm worker earned and produced considerably less than his urban counterpart in the United States during the half century under review, although this gap had appreciably narrowed by the close of that period; that a smaller differential existed for the United Kingdom; but that the income of the human agent in French agriculture was approximately on a par with earnings in French industry. In the main, these findings correspond with our expectations inasmuch as the basic causes of the differential arise from the forces associated with economic progress. And it is well known that the rate of progress has been quite rapid in the United States, somewhat slower in the United Kingdom, and virtually insignificant—for a variety of reasons—in France.

To quantify our findings, for the United States, average annual earnings in manufacturing (standardized for age, sex, and racial differences and adjusted downward for per cent of work force unemployed) were 40 per cent higher than full-time income of the human agent in agriculture over the entire half century (adjusted for cost of living differential). This percentage varied from a high of 67 in the decade 1920-29 to a low of 14 in 1940-49. If we make no allowance for differences in external characteristics, nor for urban unemployment or urban-rural cost of living, 1900-1949 earnings in manufacturing come out to be precisely twice as high as full-time labor income in agriculture. The corresponding ratio for the United Kingdom is 1.54. (Wages in manufacturing, not standardized, with no allowance for unemployment, divided by full-time income of the human agent in agriculture; for the latter no cost of living adjustment was made.) In France, by contrast, average annual earnings in provincial industry were a bare 10 per cent above full-time earnings in agriculture; the ratio of urban to farm earnings varied from a high of 1.25 in 1930-39 to a low of 0.89 in 1946-48.

Two major causes serve to explain the important and interesting differences between the behavior of the urban-farm earnings ratio for the

U.S. on the one hand and France on the other. First, the moving variable to which the income of the human agent in agriculture must adjust, as the system progresses in time, is the annual real earnings of labor in industry. In the United States, real hourly earnings in manufacturing increased at a rate of 2.2 per cent per year for the 50 years, while weekly earnings rose at a cumulative rate of 1.6 per cent. (The difference was made up by increased consumption of leisure.) In France, by contrast, hourly earnings rose by 1.2 per cent and weekly earnings by only 0.6 per cent (1896-1948). For the latter, the cumulative rate of growth was less than half that of the United States. It should be noted, that the presence of inflation, which seems indigenous to the economy of France, plus unreliable cost of living indexes make the job of computing the movement of real wages over time an extremely hazardous venture in conjec-tural statistics. If anything, the computed rate for France is overstated since other evidence indicates that real national income has remained approximately stationary for the half century under review. In any event, the low or negligible rate of growth in urban earnings means that, through time, a given proportional increment of farm-urban migration can accomplish a greater proportional equalization of agricultural and industrial earnings. For France, in other words, the "catching up" problem is of far less serious dimensions.

The second major element which explains the small size of the disparity between farm and urban earnings for France relates to the fact that, on balance, the rural birth rate for that country is not appreciably larger than the birth rate for urban areas. This is one of the many fascinating aspects of demographic behavior in France which has attracted the attention of students of population; numerous explanations have been advanced to account for this phenomenon but their exploration would take us too far afield.

One subsidiary cause of the relative prosperity of French agriculture is, paradoxically enough, the low or zero rate of technological innovation in many branches of farm production. Given a price elasticity of demand for food stuffs less than unity, a moratorium on technical progress will, it follows arithmetically, make the net income of agriculture larger than it otherwise would have been. (Moreover, the *price* elasticity of demand is the relevant magnitude for this computation, since real national income has not—the evidence indicates—measurably increased during the half century under review, consequently the price demand curve has probably not shifted to the right.) Given a low price elasticity of demand for farm products, together with a negligible degree of displacement of the demand curve to the right, technological innovation could increase the income of the human agent only if the invention in question increased the marginal

product of labor by more than that of capital, and if the possibilities of substituting labor for capital were sufficiently large.

Conclusions

In conclusion, I should like to point out some of the deficiencies, shortcomings and limitations of my study. Perhaps these are too obvious to deserve mention. Nevertheless, I should like to guard against the possibility of misuse and misinterpretation by setting forth these limitations explicitly:

(1) First and foremost, the problem of *comparability*: Despite my best judgment the groups compared may really have different levels of skill and ability.

(2) *Cost of living*: Evidence for the U.S. is fragmentary and unsatisfactory; evidence for the U. K. and France virtually non-existent.

(3) *Workers in agriculture*: Arbitrary adjustments have been made to basic census enumerations in an effort to convert to full time equivalents. The basic data are themselves replete with pitfalls; the adjustments probably are erroneous in one way or another.

(4) *National vs. regional data*: It is entirely possible that some or all of the disparity discovered at the national level may be localized in certain regions.

(5) *Non-pecuniary income in agriculture*: The disparity observed may be entirely compatible with equilibrium in real earnings if a sufficiently large increment of psychic income is imputed to farm workers.

(6) *Sources of data in general*: As can be imagined, an undertaking of this scope involves collecting and interpreting a miscellaneous aggregate of empirical raw material, much of which is dubious in its own right and unsuited to the specific purpose one has in mind. All of you can appreciate the cumulative frustrations of this kind of work, the judgments between inconsistent estimates of undefined magnitudes which must be made, and the Procustean surgery involved in hacking out the component parts so that they fit neatly into the completed edifice.

POPULATION PRESSURE ON LAND AND THE PROBLEM OF CAPITAL ACCUMULATION IN EGYPT

MAHMOUD AHMED EL-SHAFIE*

EGYPT is an underdeveloped, densely populated agrarian economy in which the only developed resources are land and water. Industry is in an infant stage. Population growth is pressing on the means of subsistence, and the surplus labor force in agriculture increasingly manifests itself in very low earnings from farming. The country has a population problem on a smaller scale than India but in some ways more acute. Between 1882 and 1947, population increased by 180 per cent, but the cultivated area and the crop surface increased by only 20 and 92 per cent, respectively. Density of population per acre rose from 1.4 in 1882 to 3.2 by 1947. Density per square mile of arable land reached 1,414 persons in 1947, one of the highest in the world. There are 20 million people in Egypt, three-fourths of whom are dependent on agriculture for employment. The country has a density of population beyond the employment capacity of agriculture; unemployment and underemployment have become chronic phenomena.

Large Population; Small Arable Area

The area under cultivation is less than six million acres while the rural population is about 15 million, the bulk of whom are tenants and hired laborers. Only 15 per cent of all people own land. Of the land owners, 90 per cent have holdings of less than five acres each, and a fraction of one per cent own 40 per cent of all farm land.

Productivity per acre of the main crops grown in Egypt is appreciably higher than in the United States, Canada, or Australia. However, the labor requirements per acre in Egypt are many times as high as in the United States. On a per man-hour basis, output in Egyptian agriculture is far below that of the U.S. Flow of capital into Egyptian agriculture is largely blocked by the excess supply of labor, and the shift to better technology is hampered by the predominance of small-sized holdings.

The rapid increases in numbers of people have not been matched with a proportional increase in resource development. The per capita income level reached in 1913 has been sustained but falls far short of full employment because the level of effective demand on the part of the underemployed masses is too low to stimulate vigorous expansion in investments. National income per capita has been between 12 and 15 pounds since 1913, and about 80 per cent of the population receive less than

* Summary of award winning Ph.D. thesis filed at the University of Wisconsin.

the average. The increasing crowdedness of labor in agriculture, due to the lack of alternative employment in other fields, makes for an unfavorable disequilibrium position in the "land-man ratio." The burden of equilibrating the excess supply of labor in agriculture, estimated at four to five million workers, falls mainly upon the labor force. This has resulted in exceedingly low earnings for farm tenants and workers and correlatively has led to high rental charges per acre. The consequence has been a deterioration in the standard of subsistence throughout the last 30 to 40 years, little saving having been made by the masses on account of their low earnings.

A large discrepancy exists between per capita incomes earned in industry, services, and agriculture. As long as this condition prevails there is an economic case for occupational redistribution that would bring about a higher level of national production. This requires substantial investment in resource development, but the level of domestic saving at present is very low and the flow of foreign capital into Egypt is negligible. A substantial part of internal savings is drained into hoards of currency and precious metals or diverted into land speculation. This prevents the development of resources which have promising investment potentials.

The high liquidity premium of land ownership and the high rents of farm land result in speculative land booms which divert savings away from the expansion of the productive capacity in industry, mining, land reclamation, and other productive fields. Capital shortages are reflected in high interest charges and in lack of modern machinery in agriculture as well as the bulk of industries. The very low per capita investment in secondary and tertiary industries operates both as cause and consequence of limited capital development.

Means of Solving the Problems

The factors which have kept the productive capacity of Egypt on a low level have been investigated, and potential resources for future development to expand the productivity of the economy are surveyed. The conclusion is that there are possibilities for doubling the cultivated area and establishing light industries as well as exploiting rich mineral deposits, fisheries, and hydroelectric power. Capital resources made available for these developmental undertakings could raise the national income and create new employment opportunities for the presently underemployed, ill-clothed, and progressively less well fed population.

Possibilities of financing the required developments with foreign capital are remote except through inter-governmental agreements. The bulk of funds for these undertakings must come from internal sources, consequently the potentialities of domestic saving to finance development are

explored. It is evident that there is a great need to institutionalize and to mobilize savings so that they may be directed into the fields of greatest urgency and highest productivity. Financial reform to facilitate long-term lending required for capital construction is proposed. It is clear that public investment in education, social services, medical care, irrigation and drainage facilities, transportation, and public utilities have raised the productivity of the economy at large. The taxable capacity of the economy is discussed and more progressive taxes are proposed—not to subsidize the low income groups but to produce "involuntary savings" for investment in economic development.

The level of savings is low both on account of the low incomes of the majority and the luxury spending of the high income strata. This suggests that a nationwide saving plan is needed. A social security savings plan seems promising for the low incomes. Sales of governmental bonds, too, as well as increased taxes upon higher income receivers, would bring about more adequate savings which could be used to produce capital. The problem then would be to insure against internal inflation because of the prevailing high propensity to consume, the rigidities of the present productive facilities, and the unfavorable balance of trade connected with them. Possible lines of action are discussed for the purposes of expanding the productive capacity in agriculture and industry to increase employment opportunities and to maintain economic and social stability.

SOME ALTERNATIVE SAMPLING TECHNIQUES IN THE MEASUREMENT OF FARM-BUSINESS CHARACTERISTICS*

QUENTIN M. WEST

Inter-American Institute of Agricultural Sciences

AREA-SEGMENT sampling on a probability basis has spread very rapidly in the few years since it was introduced and perfected to the point of practical applicability. It offers many advantages where, as in most studies of farms, universe lists are expensive to assemble, costs of travel are high, the universe turns over slowly but continuously through time, and geographic location is a significant characteristic of all observational units.

The usefulness of area-segment sampling varies, however, with the circumstances under which it is employed. There also are many alternative area-segment designs, some of which are likely to be more satisfactory than others under given circumstances. The project here reported was undertaken to investigate the suitability of alternative area-segment designs under certain New York State conditions. It represents only a beginning in this direction, in view of the many sampling alternatives, the multiplicity of purposes served by projects that employ sampling, and the agricultural variability from area to area in the state.

The project was an attempt to accumulate a body of working experience that may become part of applied statistics in research specialties where farms and farming must be studied in the field. Experimentation with a real universe played a major part in the project, although the role of theory was by no means unimportant. Statistical theory provided hypotheses for experimental testing as well as some measure of independent evidence in many instances.

The complete enumeration data collected for the open-country areas of Seneca County in the years 1948-49 were used throughout the project. Five hundred fifty-six records were used, these being the records classified as full-time commercial farms (cases where 11.5 months or more male time household or hired, were available for farm work and where the farm work accomplished amounted to 100 or more productive-man-work units).

Three farm-business characteristics were treated in all phase of the study: Total acres operated, acres in crops, and size of business in productive-man-work units. Twelve additional characteristics were introduced in the earlier phase of the study. Universe frequency distributions were constructed and parameters were computed for the 556 full-time farms for all fifteen selected farm-business characteristics. All of the universe

* Summary of award winning Ph.D. thesis filed at Cornell University.

frequency distributions were highly skewed to the right, deviating significantly from the normal distribution. The universe distribution for productive-man-work units contained one farm with more than twice as many units as the next smaller farm. The presence of this extremely long, discontinuous tail greatly affected the sampling results for this characteristic.

Simple Random Sampling¹

Actual research on the project started with simple random sampling and moved later to area-segment sampling. Simple random samples involve less complicated procedures in selection and can be analyzed in a more direct and simplified manner. Standard sample theory has been built around simple random sampling, while the theory used in estimating sampling precision when observational units are geographically grouped into sampling units involves special adaptations of simple random sample theory.

In the first experiment, 100 samples of 100 full-time farms were drawn at random from the above universe (each approximately a 20 per cent sample). In the second experiment, 100 sub-samples of 25 full-time farms were drawn at random from the farms in the 100-farm samples of the first experiment (each approximately a five per cent sample of the universe). An examination of the empirical distributions of sample means, medians, variances, standard deviations and t values was made in both experiments.

The evidence collected in the simple random sampling phase of this study supports the following general points:

1. The agricultural economist is justified in using tabulated probabilities for the normal distribution in testing the significance of differences between hypothesized universe means and sample means, and in setting confidence limits about sample means when he is working with simple random samples of farms in a general farming area like Seneca County.

2. The use of the chi-square distribution may not be valid in making tests of hypotheses and setting confidence limits for the sample variance under these circumstances.

3. Since the variances of usual interest to agricultural economists are not distributed as expected in normal theory, the suitability of the F distribution may be questioned in testing for relationships in analyses of variance that involve more than one degree of freedom in each variable. Distributions of actual F values for samples from farm-business universes

¹The following mimeograph presents a more detailed summary of the simple random sampling phase of the report: Quentin M. West, *The Results of Applying a Simple Random Sampling Process to Farm Management Data*, A.E. 743, Agricultural Economics Department, Cornell University.

must be investigated before a well founded working rule can be established on this point. It may be that, through compensating effects, the ratios of two variances are commonly distributed as F , even though the variances themselves are not distributed according to normal theory.

4. As the universe becomes more highly skewed, the median becomes a more valuable statistic than the mean for many practical purposes. This study suggests that the median also actually has smaller sampling variability than the mean when used to describe some farm universes.

5. It may be worthwhile in selecting farm universes for particular research projects to consider the likelihood that sampling distributions for some statistics are quite sensitive to the shapes of universe frequency distributions. It is usual in agricultural economic research to exclude small farms, out-of-type farms, and often atypically large farms in an effort to buy the most valuable information with the limited funds available. It is possible that further improvement in these choices might result from a more careful consideration of the shapes of resulting frequency distributions and the consequent suitability of standard statistical theory for interpreting the study results.

Area-Segment Sampling

Five area-segment sample designs were investigated. The particular designs selected were suggested as having practical application in actual farm management and land economic surveys. Three of these designs assumed a knowledge only of the location of open-country households in the county, together with some information on the proportion of full-time farms among the open-country households. For the other two designs, use was made of knowledge of the full-time farms available from the actual survey in the county and these farms were located on a map in their proper positions.

For the first area-segment design, enough open-country residences were included in each segment to make the expected number of farms per segment closely approximate three. One hundred samples consisting of thirty-three segments were drawn at random from the universe, and all elements within the selected segments were enumerated.

In the second area-segment experiment, the number of farms per sample was held as nearly constant as possible, the number of segments included in each sample being allowed to vary. The same segments were used as in the first experiment. Segments were added to the sample until the total number of farms enumerated was approximately equal to 100. One hundred samples were drawn using this design.

Objective of the third method of area-segment sampling was to determine the effect of larger segments on the sampling precision. Segments

were defined as in the previous designs, with the exception that the expected number of full-time farms in each segment was six instead of three. One hundred samples were drawn with the number of segments included in each sample varied so as to obtain approximately 100 farms.

In constructing the sample frame for the fourth area-segment design, information at hand on the actual locations of individual farms was used. Segment boundaries were drawn to include three adjacent full-time farms. One hundred samples consisting of 33 segments were drawn and all farms within selected segments were enumerated.

The fifth area-segment sample design involved the systematic selection of sampling units. For this experiment, sampling units consisted of the segments which were delineated for the fourth area-segment design. Segments were numbered in a serpentine fashion following the roads up and down or across the county. Twenty different orderings of the segments were made in this manner. Samples consisted of every fifth segment, thus, there were five possible samples for each pattern of segments. All possible samples were enumerated, so the exact sampling distribution of means was known for each pattern.

Comparative Precision of Sample Designs

The following results were obtained in an empirical evaluation of the six sample designs of approximately 100 farms (Table 1): The systematic area-segment design had somewhat less sampling variability than any of the other designs. Compared to the 20 per cent individual random design the systematic design showed an average gain (average of three farm-business characteristics) of one per cent, the first area-segment design had a loss of 15 per cent, the second a loss of 44 per cent, the third a loss of 37 per cent and the fourth area-segment design a loss of 12 per cent.

There was a loss in precision of 27 per cent in the second area-segment design compared to the first area-segment design even though the sample size was held constant in the second design.

The third area-segment design, similar to the second except that the segments had twice as many farms on the average, showed a gain in precision of 17 per cent over the second design.

The fourth area-segment design, with constant segment size, resulted in less than one per cent gain over the first area-segment design but had a gain of 21 and 16 per cent, respectively, over the second and third designs.

In comparing the systematic with the random selection of area-segments, the systematic design showed a 13 per cent gain over the fourth area-segment design.

TABLE 1. VARIANCES OF 100 EXPERIMENTAL SAMPLE MEANS, SEVEN SAMPLE DESIGNS, THREE FARM-BUSINESS CHARACTERISTICS, SENECA COUNTY, NEW YORK, 1948

Sample Design	Average Number of Farms per Sample	Total Acres Operated	Acres in Crops	Productive- Man-Work Units
	Number	Variances		
Twenty per cent individual random	100	96	41	825
Five per cent individual random	25	401	157	3354
First segmented random	104	128	53	686
Second segmented random	100	138	71	950
Third segmented random	100	136	60	928
Fourth segmented random	99	109	51	820
Segmented systematic ¹	111	92	37	917

¹ Averages for 20 distributions of five sample means.

Conclusions

The evidence recorded in this study provides support for the following conclusions. It is hoped that these may be helpful in further sampling research and may serve as first approximations to satisfactory working guides in farm management and land economic surveys.

1. The extra cost usually involved in obtaining a mapped pre-list of farms appears not to be justified by the slightly increased precision that may be gained through holding area-segments constant in number of farms. If a good map is available showing open-country dwellings and an estimate can be obtained for the proportion of these dwellings that are farms, satisfactory area-segments may be delineated without further information.

2. There is a loss in sampling precision when the number of segments per sample is varied to maintain a constant number of farms. Such a practice also complicates theoretical estimates of sampling variability.

3. In a farming situation similar to Seneca County, with area segments delineated as they were in this study, it is better to include an average of six farms per segment rather than three. The precision of six-farm segment designs may even exceed that of the three-farm segment designs and the costs of enumeration vary likely would be less with the larger segments.

4. On the average the systematic selection of area-segments is less variable than the random selection of similar segments. However, this design does not guarantee a gain in sampling precision over a random selection of segments. The sampling variance for some of the patterns used in the systematic sampling was very small, but for others it was relatively large as compared to the variance of random samples. This emphasizes the necessity for careful planning in setting up patterns of sampling units for systematic selection. Soil and land class maps and other available information might well be studied before the sampling units are arranged

in patterns, in order to avoid as much as possible periodicities that create large differences among individual samples.

In presenting results of these sampling experiments, it is recognized that they themselves also are subject to sampling fluctuations. The 100 samples drawn for each of the designs constitute a relatively small proportion of the total samples that might have been drawn. Twenty systematic patterns also are but a few of the possible patterns that might have been set up.

Sources of variation in the sample designs used are very complex and there is much yet to be learned about them. Further investigation into the effect of the ordering of sampling units on systematic sample results would be profitable. This should include a study of the systematic selection of individual farms.

The effect of stratification upon the precision of these sample designs needs investigation. The area-segments of this study were delineated within land classes, making it easily possible in future experiments to impose a stratification by land class upon these designs. Unless stratification by land class is used in drawing the sample, the area-segments probably should not be delineated within land class. Various modifications in the methods of delineating area-segments could well be looked into relative to their effect on sample results.

Before these designs can be fully evaluated as to sampling efficiency, an investigation should be made of the relative costs of obtaining the desired information from surveys using the various sample designs.

Caution should be observed in generalizing these results to other areas. If the farming situation is different, the effect of combining groups of farms into area-segments may be different. The effect of the ordering of sampling units upon the precision of systematic samples may also vary with the character of the area in which the study is being made. General knowledge of farming in New York state suggests that sampling principles evolved for Seneca County might hold reasonably well in other areas of the Lake Plains Region, but may not be fully applicable elsewhere in the state and may well be considered only suggestive in other regions of the country.

MINUTES OF THE MEETING OF THE EXECUTIVE COMMITTEE,
AMERICAN FARM ECONOMIC ASSOCIATION, UNIVERSITY
OF ILLINOIS, AUGUST 28, 1952

Present: Aull, Hoos, James, Paarlberg, Trelogan, Waugh, Wellman, Witt.

The meeting was called to order by President George Aull.

Minutes of the preceding Executive Committee meeting were read and approved.

Harry Trelogan's report on the awards was accepted.

Larry Witt reported the selection of the Editorial Committee on the best Journal article. After some discussion, it was decided to report to the general meeting the names of those receiving honorable mention of their work.

A decision was made to present the cash awards at the annual meeting, when winners are to be announced.

F. V. Waugh reported on the book: *Readings in Agricultural Marketing*. A manuscript is prepared and a contract is being negotiated with the Iowa State College Press. The committee, headed by Asher Hobson, was authorized to complete a contract with Iowa State College Press or some other printer.

Larry Witt presented his editor's report. Policy on the volume of published information during the coming year was deferred until Friday.

The Secretary-Treasurer presented his report of the year's business, which was accepted.

President Aull read a letter from R. L. Kohls, auditor of the Secretary-Treasurer's accounts, raising a question as to the desired level of reserves and services to members.

On the recommendation of Joe Ackerman, it was decided to recognize the student participants in the debates with suitable awards. The winning team is to receive a certificate and each man is to receive free of charge a five-year subscription to the Journal. Members of the runner-up team are each to receive a three-year subscription, and each other debater at the conference is to receive a one-year subscription. Ackerman is to suggest a suitable certificate, and the Secretary-Treasurer is to send subscriptions beginning with the Proceedings Issue.

It was decided to announce that any of our foreign visitors desiring a copy of the Proceedings could receive one for the charge of \$1.25 by placing his name on a list to be provided by G. L. Jordan.

The new executive committee is to convene at 11:00 A.M., Friday in Room 112.

Meeting was adjourned.

DON PAARLBERG, *Secretary-Treasurer*

MINUTES OF THE ANNUAL BUSINESS MEETING,
AUGUST 29, 1952

President George Aull called the meeting to order at 10:00 A.M. and presented his report, which is appended.

The Secretary-Treasurer made his report, also appended, which was approved.

The report of the auditors, shown separately in these minutes, was submitted and approved.

F. V. Waugh, editor of the forthcoming book *Readings in Agricultural Marketing*, reported that a manuscript is ready and negotiation for publication is underway. An agreement with the publishers is expected in a few days.

Joe Ackerman presented the following two resolutions:

1. "We wish to express our appreciation for the hospitality of the University of Illinois—we need not dwell at length on the excellent facilities, the efficient arrangements, and the strong feeling of sincere friendliness; we want to express our gratitude for the many favors and services performed in our behalf, and to that end we wish to express our sincere thanks to the staff and administration of the University of Illinois. Especially we wish to thank the Committee members who have made our visit so enjoyable.

"We direct that this expression of thanks be spread on the minutes of this meeting. And that our secretary transmit the sense of this motion to the University, and that it also be carried directly to our friends at the banquet on Saturday."

2. "That the American Farm Economic Association express its appreciation to the heads of the department of Michigan State College and Purdue University for permitting members of their staff to serve as Editor of the *Journal of Farm Economics* and Secretary-Treasurer respectively."

Mr. Ackerman presented the following statement on the life of long-time member Nat C. Murray, recently deceased, and asked that it be made a part of the record:

"The death of Nat C. Murray on Tuesday, August 26, 1952, took from this Association one of its early and long-time members.

"Mr. Murray was born in Indiana November 29, 1872, and in 1904 he became an employee of the U. S. Department of Agriculture in the Bureau of Statistics. His training at the University of Cincinnati and his experience as Assistant Editor of the *Indiana Price Current*, published by his father, prepared him for the contributions he later made in the agricultural data of this country. These include the initiation of the collection of monthly data on prices paid for farm products about 1907, and of prices farmers paid for commodities bought, several years later. The 1909-14 base in agricultural price indexes was made possible by his early work.

"He also had much to do with the development of the department's program of forecasting crop production, which was begun in 1912, and with the reports on intentions to plant crops and to breed livestock, which had their beginning in World War I experience.

"He became head of the Bureau of Statistics in 1914 and originated the plan

of decentralizing that work by establishing field offices in the states. He was active on census committees and made important contributions to the agricultural census of 1920.

"In 1923, he left government work to enter private employment, but retained his interest in the field of agricultural economics and his membership in this Association for many years. He spent the last few years of his life in retirement at Waynesville, Ohio."

L. J. Norton submitted the report of the election tellers, which is appended.

Retiring President Aull then introduced Incoming President H. R. Wellman and other newly-elected officers. Wellman stated that the 1953 meeting would be at Corvallis, Oregon, August 18, 19, and 20.

The meeting was adjourned.

DON PAARLBERG, *Secretary-Treasurer*

REPORT OF THE PRESIDENT

It is with reverence and deep humility that I open this report to you with a quotation from Psalms: "The lines are fallen to me in pleasant places; yea, I have a goodly heritage." It was with trembling hands that I took over from "Frosty" Hill the presidency of this Association. Under his splendid leadership, we came to the meeting in Guelph last July with 271 more members on our rolls than we had the year before. About 50 of these had paid dues through the current fiscal year. It was confidently expected that receipts from 1952 memberships would decline and a net deficit of about \$2000 was predicted for the year. I felt like a Winston Churchill in reverse! In light of these facts you can understand the joy that is mine as I tell you that our membership not only did not decline but increased to the highest on record and our financial condition did not worsen, it improved!

Much of this continued growth in the membership and financial strength of our Association we may attribute with certainty to its "goodly heritage." Down through the years the officers and members of this organization have built well on firm foundations and we who have served you this year have experienced the satisfaction of reaping what they had sown. No one appreciates this more than I. To all of them, I am eternally grateful.

The lines, truly, have fallen to me in pleasant places. This has been a "good" year. The innumerable details in connection with the program and the conduct of all the various other activities of the Association have been carried out with the active assistance of all officers and committee chairmen and the most cheerful cooperation of the membership. Obviously it is impossible to recognize by name all those whose labors have served to make light the duties of your president and whose attitudes have added zest to what otherwise would have been a routine performance. I do, however, even at the risk of omitting some who should be mentioned, want to pay tribute to the fine work of Don Paarlberg, our very efficient and agreeable Secretary-Treasurer; Harry Trelogan, Chairman of the Committee on Awards; Asher Hobson, Chairman of the Investment Policy Committee and of the Committee on Publications; Larry Witt, *Journal* Editor; Fred Waugh, Editor of the book of *Readings on Agricultural Marketing*; Joe Ackerman, Chairman of the Student Committee; and Professor H. C. M. Case, Chairman of the Local Arrangements Committee. A large part of the active work of the Association was done by these men and those who served with them on the committees. I am indebted to Brooks James, Joe Ackerman, and particularly to my colleague, James M. Stepp, for invaluable assistance in

connection with the program. I also extend hearty thanks to all who so graciously accepted our invitation to participate in this meeting. Last but by no means least, I derived much benefit from a report prepared by my predecessor which he entitled, "What an incoming president should know."

Incidentally, it may be of some significance, though I don't know just what it is, that I succeeded in this position a man who is now a Provost and I will be succeeded by a man who is now a Vice-President.

In closing, let me tell you again how much I appreciate the honor and the privilege of having been your president. I have derived much pleasure from the experience and, I hope, a few ideas which may be of importance in the future development of this Association. The pleasure I shall treasure throughout life. The ideas I propose to pass on to the incoming officers.

GEORGE H. AULL, *President*

REPORT OF THE ELECTION TELLERS

The count of the ballots showed the following officers elected for 1952-53:

President-Elect	T. K. Cowden
Vice-President	D. Gale Johnson
	True D. Morse
Secretary-Treasurer	Don Paarlberg
	Tellers: L. J. NORTON
	R. W. BARTLETT

REPORT OF THE EDITOR

The 1951-52 issues of the *Journal* contain 1,096 pages of which 480 pages represent the *Proceedings*. This is well within the page limit set by the Executive Committee, but the *Proceedings* issue is somewhat large compared with earlier years. For the period, the *Journal* was just within the planned financial budget.

The new editor took over from Dr. Wilcox after the *Proceedings* issue was completed. He appreciates the help of Dr. Barlowe in putting out the February issue while the editor was in Rome, and the help of Professor Halcrow in handling the Book Review section.

Two changes in policy have been made. The first of these was the publication in May of the Ph.D. theses completed in 1951, which is planned as a regular feature. The second is the separation of the November and *Proceedings* issue into a November and December issue. This will permit separate mailing and assure that the November issue is not unduly delayed. The editor has also tried to speed up the editorial process so that the regular issues can be in the mail preferably by the middle of the indicated month.

The number of articles submitted to the editor has been increasing. There already are more than enough interesting and good quality manuscripts on hand for the February issue. If this situation continues, it will become necessary to reappraise the *Journal* policy. There are several lines of choices available. Should more articles be printed in the regular issues or should a third to a half of the articles on hand be rejected? If the regular issues are expanded, should this be through a larger printing budget, or through reducing the size of the *Proceedings* issue? If the former, how can the income of the Association be increased; if the latter, what steps should be taken to shorten the *Proceedings*?

These questions were put to the Editorial Committee and the replies indicate a wide range of opinion, encompassing most of the possible combinations of the above alternatives. The editor and members of the Council will welcome suggestions from the membership.

Respectfully submitted,

LAWRENCE WITT, *Editor*

REPORT OF THE SECRETARY-TREASURER

Membership and net worth of the American Farm Economic Association have increased steadily since the organization was founded.

This past year has been one of steady, though not spectacular, growth in the Association. Membership increased slightly, as shown by the following table:

Number of Members and Subscribers, July 1, 1951 and July 1, 1952

	July 1, 1951	July 1, 1952	Net Change
Regular Members	1,515	1,534	+19
Junior Members	149	107	-42
U. S. Libraries and Firms	307	321	+14
Foreign Libraries and Firms	272	317	+45
Exchanges	12	0	-12
Totals	2,255	2,279	+24

The whole of the increase can be attributed to the efforts of President George Aull, who brought 25 members back by writing personal letters to those who had let their membership lapse.

Financially, the year was more successful than had been expected. A loss of \$1,950 had been anticipated in the budget, but actually a slight gain was made. Appreciation of securities held by the Association, when added to the slight gain in receipts over expenses, increased the net worth almost \$2,000 during the year.

The successful financial record of the Association during the past year, as during former years, may be attributed to the generosity of the unpaid men who have given their time and the unpaid institutions which have provided clerical help for the various officers.

INCOME AND EXPENSE STATEMENT

	Actual 1950-51	Actual 1951-52	Budgeted for 1951-52
<i>Income</i>			
Dues	\$11,414.64	\$11,107.95	\$ 9,850.00
Back Numbers	542.08	789.60	500.00
Reprints	1,438.21	372.00	600.00
Advertising	200.00	401.80	200.00
Annual Meeting	538.20		500.00
Collected for WFEA		307.38	
Collected for CAES		88.50	
Collected for Student Section		85.00	
Dividends and Interest	2,170.22	2,527.16	2,200.00
Other	105.77	12.14	50.00
	<u>\$16,409.12</u>	<u>\$15,691.53</u>	<u>\$13,900.00</u>

Expenses

Journal Printing	\$11,452.38	\$12,496.53	\$12,500.00
Back Numbers	660.00	457.25	200.00
Postage and Wires	375.81	286.12	375.00
Annual Meetings	613.83	143.91	600.00
Editorial Expense	742.00	697.50	750.00
Office Supplies	268.33	950.90	1,200.00
Paid to WFEA		316.88	
Paid to CAES		90.85	
Other	222.98	213.75	225.00
	<u>\$14,335.33</u>	<u>\$15,653.69</u>	<u>\$15,850.00</u>
Net Gain	\$ 2,073.79	\$ 37.84	— \$ 1,950.00

FINANCIAL STATEMENT

	July 1 1951	July 1 1952
<i>Assets</i>		
Cash in Bank	\$ 6,635.16	\$ 7,595.29
Market Value of Stocks	27,697.12	37,140.15
Market Value of Bonds	38,984.00	29,458.81
	<u>\$73,316.28</u>	<u>\$74,194.25</u>
Liability to Special Grants Fund	13,475.96	12,312.86
Liability to Student Section AFEA		77.50
	<u>\$59,840.32</u>	<u>\$61,803.89</u>
Net Worth		

ADJUSTMENTS TO SPECIAL GRANTS FUND

On Hand July 1, 1951	\$13,475.96
Interest Earned During Year	336.90
	<u>\$13,812.86</u>
Awards Made During Year	1,500.00
	<u>\$12,312.86</u>
On Hand July 1, 1952	

ADJUSTMENTS IN NET WORTH

	1950-51	1951-52
Net Worth at Beginning of Year ..	\$56,881.80	\$59,840.32
Net Gain	\$ 2,073.79	\$ 37.84
Change in Inventory Value of Stocks	992.40	9,443.03
Change in Inventory Value of Bonds	25.75	— 9,525.19
Interest Credited to Special Grants	— 133.42	— 336.90
Change in Liability to Student Section		— 77.50
Net Change from Purchase and Sale of Securities		2,422.29
	<u>2,958.52</u>	<u>1,963.57</u>
Net Worth at End of Year	\$59,840.32	\$61,803.89

DON PAARLBERG, Secretary-Treasurer

REPORT OF THE AUDITORS

At the request of the President of the American Farm Economic Association, we have examined the accounts of the Secretary-Treasurer, Don Paarlberg, for the period July 1, 1951, to June 30, 1952.

We have checked all disbursements recorded in *This Journal* against the record of the check book. Although individual income entries were not checked, the total of gross receipts was verified as to its aggregate level. Both the cash receipts and cash disbursement books were found to be in balance. The treasurer's report of income and expenses and the financial statement for the period indicated were found to reflect accurately his records of the transactions and the financial position of the Association. The securities belonging to the Association were found to be in order in the bank box.

The Secretary-Treasurer has put into effect the recommendations previously made. It is suggested that the net worth, as currently reported, understates the true position of the Association. It is recommended that the following actions be taken to adjust this situation:

- (a) Establish accounts which will reflect "accounts receivable" and "pre-paid and accrued expenses."
- (b) Establish accounts which will reflect the value of the Association's JOURNAL OF FARM ECONOMICS inventory and office equipment.

Respectfully submitted,

R. L. KOHLS

R. L. STUCKY

MINUTES OF THE EXECUTIVE COMMITTEE MEETING, AUGUST 29, 1952

Present: Ackerman, Aull, Huffman (for Hoos), James, Johnson, Morse, Paarlberg, Reid, Wellman, Witt.

Meeting called to order by President Wellman.

Minutes of the executive meeting of August 28 were read and approved.

The report of the investment committee was given by the Secretary-Treasurer.

A budget for 1952-53 was suggested by the Secretary-Treasurer as follows:

BUDGET FOR 1952-53 AMERICAN FARM ECONOMIC ASSOCIATION

	Actual 1951-52	Budgeted for 1952-53
<i>Income</i>		
Dues	\$11,107.95	\$11,500.00
Back Numbers	789.60	600.00
Reprints	372.00	800.00
Advertising	401.80	500.00
Annual Meeting		500.00
Collected for WFEA	307.38	300.00
Collected for CAES	88.50	100.00
Collected for Student Section	85.00	100.00
Dividends and Interest	2,527.16	2,500.00
Other	12.14	100.00
	<hr/> \$15,691.53	<hr/> \$17,000.00

Expenses

Journal Printing	12,496.53	13,500.00
Back Numbers	457.25	300.00
Postage and Wires	286.12	400.00
Annual Meetings	143.91	500.00
Editorial Expense	697.50	700.00
Office Supplies	950.90	400.00
Paid to WFEA	316.88	300.00
Paid to CAES	90.85	100.00
Paid to Student Section		100.00
Other	213.75	200.00
	<hr/>	<hr/>
	\$15,653.69	\$16,500.00
Net Gain	\$ 37.84	\$ 500.00

After some discussion, Morse moved and Reid seconded approval of the budget as a guide rather than as an inflexible document. The motion was passed.

There followed some discussion on the size and cost of *This Journal* for the coming year. Editor Witt was authorized to make moderate changes in the size of the *Journal* without consulting the executive committee. In view of the quantity of deserving articles, a slight increase in the number of pages for the regular issues was suggested by Witt.

Ackerman reported 29 clubs operating in the Student Section. He asked that he be relieved of a part of his responsibility for the Student Section, and gave the names of Lawrence Boger (Michigan State) and Joe Mutti (Illinois) as individuals suitable for bearing this responsibility.

Aull initiated and Johnson seconded a motion to have the Secretary send \$25 to defray the expenses of Earl R. Swanson, who reported on his honorable mention thesis at the general meeting. Motion carried.

Aull moved and Johnson seconded an action authorizing payment of expenses, not to exceed \$75 per man, to such winner or winners of honorable mention in thesis competition as are brought to the 1953 annual meeting at Corvallis, Oregon. It is recognized that not all three of the top honors men may be able to attend that meeting, and this action was intended to make it possible to pay a part of the expenses of one or possibly two honorable mention winners in order to provide a review of two competent theses. Motion carried.

The question of whether current research bulletins and articles should be reviewed in *This Journal* was discussed without action.

The various suggestions in the letter to President Aull of the 1952 auditing committee were discussed without action.

Aull moved and Morse seconded an action directing President Wellman to appoint a committee to make a lieasurely review of the foregoing and other questions. This motion was carried. Other questions, including the advisability of publishing a directory and general questions regarding the scope and cost of Association activities, were discussed. This committee was instructed to report prior to the 1953 annual meeting.

Johnson initiated and Aull seconded an action authorizing President Wellman to appoint an advisory committee to work with the Bureau of Agricultural Economics on crop estimates. Motion carried.

Asher Hobson's request to be relieved of his duties on the investment committee was received. Wellman indicated that he would appoint a successor to

Hobson. The name of Ernest Baughman of the Federal Reserve Bank of Chicago was mentioned.

Aull mentioned that a committee to work up statistics on labor and income, authorized by a 1951 meeting of the executive committee, had not been set up. Wellman suggested that this might be done during the present year, and indicated an interest in the possibility of getting Johnson to accept chairmanship of this committee.

Hobson's activities as the library custodian of scientific material published by members of the Association was noted. Cooperation of members in building up this library was solicited.

On motion by Aull and second by Reid, Lawrence Witt was appointed editor of *This Journal* for the coming year.

Wellman asked for suggestions regarding topics for the 1953 program. Aull suggested that he solicit suggestions by writing to members.

Morse suggested a session on *Agricultural Outlook* at the 1953 meetings.

Aull reported that a registration fee of \$2 per member is authorized for annual meetings by a previous act of the executive committee. Presumably this would apply for the 1953 meetings at Corvallis.

It was suggested that arrangements might be made to provide convenient stop-over visits at Western agricultural colleges as members motored to the Corvallis, Oregon, meetings in 1953. There appeared to be a question as to how many members would avail themselves of these arrangements.

Paarlberg moved and Johnson seconded an action reaffirming the action of earlier executive committees in these matters:

1. Denying the use of the *Journal* mailing list to commercial agencies for advertising purposes.
2. Excluding exchange advertisements from *This Journal*.

The motion carried.

Paarlberg initiated and Johnson seconded a motion authorizing the editor to enter into exchange arrangements with publishers of suitable journals abroad, at his discretion. At present there are no such exchanges, as a result of earlier executive committee decision. Motion carried.

Adjournment.

DON PAARLBERG, *Secretary-Treasurer*

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AWARDS FOR RESEARCH IN AGRICULTURAL ECONOMICS, 1952

To recognize and encourage meritorious research the American Farm Economics Association made seven awards in 1952: one of \$100 for the best article appearing in the JOURNAL OF FARM ECONOMICS during 1951; three of \$250 each for the best research reports published during 1951; and three of \$250 each for the best theses submitted during 1951 in partial fulfillment of requirements for Doctor of Philosophy degrees. The recipients of these awards were:

Best Journal Article

Frederick V. Waugh	"The Minimum-Cost Dairy Feed" August, 1951
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Outstanding Ph.D. Theses

Procter Thomson	"Productivity of the Human Agent in Agriculture: An International Comparison"
Mahmoud A. El-Shafie	"Population Pressure on Land and the Problem of Capital Accumulation in Egypt"
Quentin M. West	"Some Alternative Sampling Techniques in the Measurement of Farm Business Characteristics"

Honorable Mention

Sherwood O. Berg	"An Economic Analysis of Production Credit Associations in the State of Minnesota"
Earl R. Swanson	"Agricultural Resource Productivity and Attitudes Toward the Use of Credit in Southern Iowa"

Outstanding Published Research Reports

Karl A. Fox	"Factors Affecting Farm Income, Farm Prices, and Food Consumption"
Orlin J. Scoville	"Relationship Between Size of Farm and Utilization of Machinery, Equipment, and Labor on Nebraska Corn-Livestock Farms"
Marguerite C. Burk	"Changes in the Demand for Food from 1941 to 1950"

Honorable Mention

Ernest J. Nesius	"Allocation of Farm Resources for Economic Production of Pasture Forage"
Willard W. Cochrane	"An Analysis of Farm Price Behavior"

G. H. Aull, *President*

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